SOUTHERN POWER AND INDUSTRY

SEPTEMBER, 1956

Southern Power & Industry provides information that will help solve design, installation, maintenance and operating problems of engineers and executives in manufacturing, processing, service and power plants in the South and Southwest.

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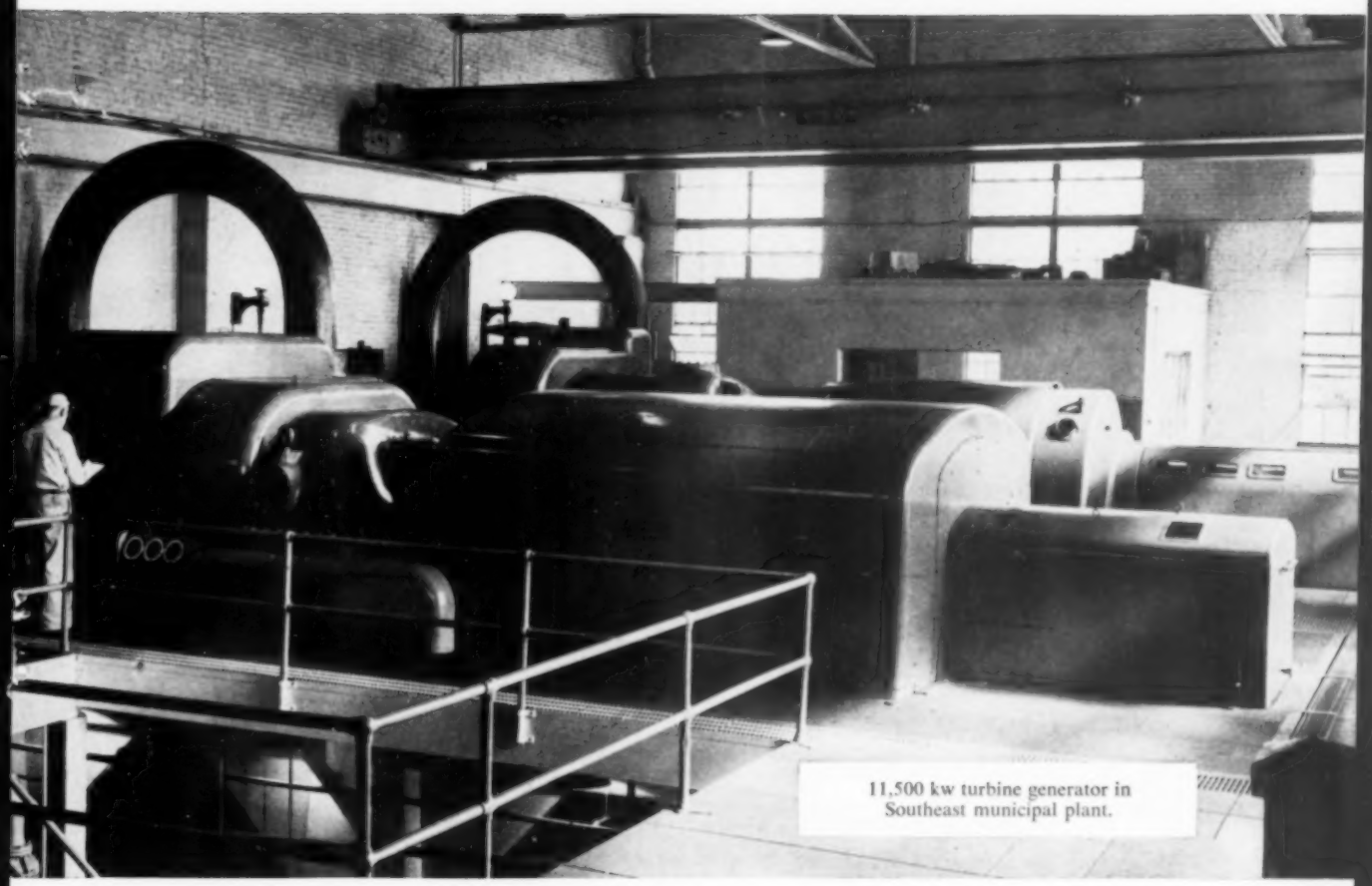
SOUTHERN POWER & INDUSTRY is published monthly by W. R. C. Smith Publishing Co., Executive and Editorial Offices: 806 Peachtree St., N.E., Atlanta 8, Ga. Entered as second-class matter at the Post Office, Charlotte, N. C. Subscription Rates: United States and Possessions, $1.50 per year or three years for $3.00; Foreign Countries, $10.00 per year.

Volume 74 Number 9



11,500 kw turbine generator in Southeast municipal plant.

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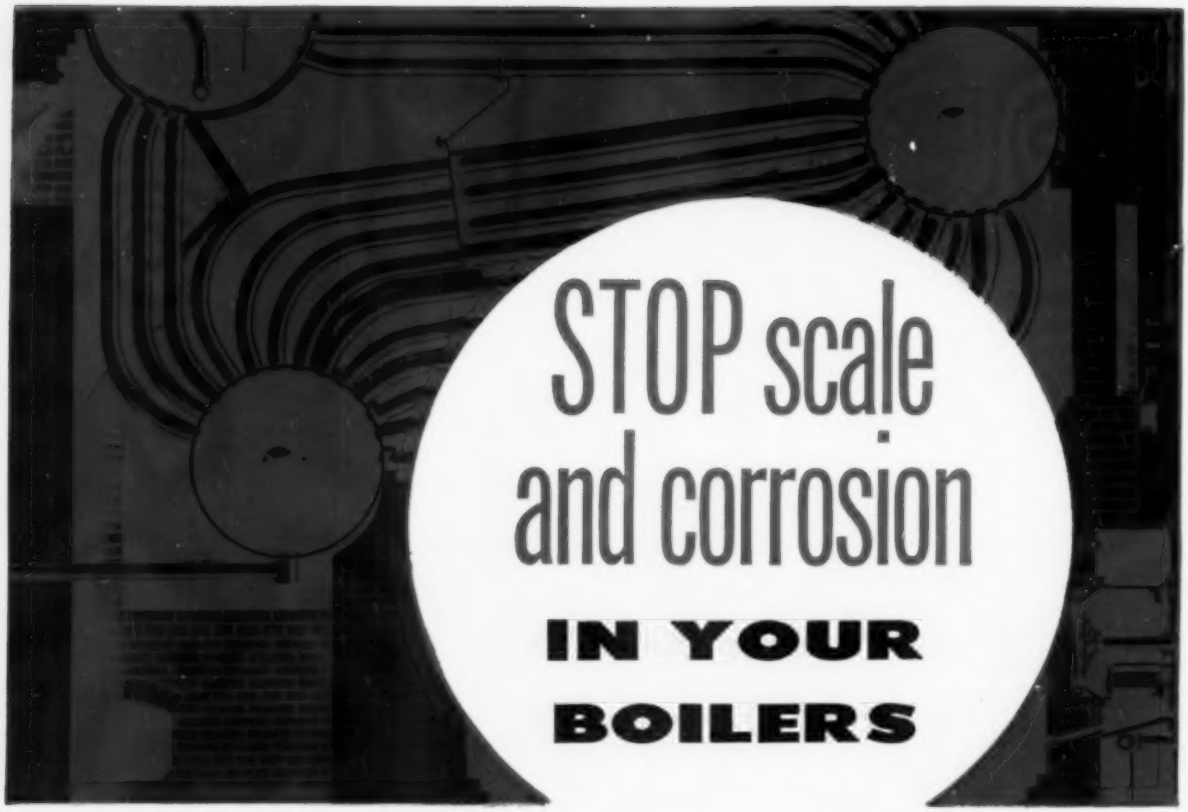
Take priority, for example. Because Worthington is not involved with building the huge central station turbine generators, they give A-1 priority to the design and manufacture of industrial and municipal units.

Every Worthington turbine generator receives the personal attention of top engineering and manufacturing personnel. Skilled craftsmen, with years of experience in the manufacture of turbine generators, take pride in their job of building reliability into every part. They take the time and trouble to take care of the little things that mean so much to dependable operation. Their attention to detail is reflected in such things as the dials which are recessed and mounted at an angle for easy reading. And before it is allowed to leave the factory, every unit is completely assembled and meticulously tested.

When considering a turbine generator installation up to 15,000 kw, call on the *specialists* in the field. Get in touch with your nearest Worthington District Office or write for Bulletin 1960C. Address Section T63, Worthington Corporation, Harrison, N. J.

T-63

WORTHINGTON



STOP scale and corrosion IN YOUR BOILERS

Every good engineer knows that the costly shut-downs and repairs caused by scale and corrosion can be avoided through the use of the right feed-water treatment. That's why hundreds of the best engineers use Braxon and Flako formulas.

These highly-developed products, based on phosphate or carbonate control, prevent and remove scale in boilers. They also prevent foaming and carryover.

There's an Anderson field representative in your area who has broad experience in every kind of industrial water problem. He will gladly analyze your water and prescribe the proper treatment to protect your equipment against costly corrosion and scale. What's more, he will continue to make periodic analyses to be sure you are being properly protected. The valuable service costs you nothing. It can save you much. Let us know when you would like to see him.

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SOUTHERN POWER AND INDUSTRY

Vol. 74
No. 9

SEPTEMBER, 1956

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Annual Subscription—$1.50
Foreign—$10.00

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Published monthly by
W. R. C. SMITH PUBLISHING CO.
Atlanta, Ga., and Charlotte, N. C.

Publishers also of *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, and Southern Building Supplies.*

FEATURE ARTICLES IN THIS ISSUE

DESIGN, OPERATION AND MAINTENANCE

SHORT SOLUTIONS AND SUGGESTIONS

REGULAR FEATURES—DEPARTMENTS

Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 8, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

September 1, 1956

◆ QUICK PEAK, CUT OFF REQUIREMENT at Philip Morris in Richmond, Virginia, makes automatic operation of their new Queen City water tube boiler particularly interesting. Operating highlights are featured in this issue.

Tobacco is humidifed by a "batch process" that calls for quickly meeting full steam demands and then a sharp cut-off. Normal cycle processes three batches per hour, and steam is required for about 14 minutes on each charge. At other times the process demand drops to nearly zero, and in summer the heating load is completely off.

Boiler must be ready to supply steam at rate of 5,000 lb/hr on quick demand and return to no load (with burners extinguished) very rapidly. Normal steam pressure of 125 lb varies less than 5 lb on these sudden swings. Efficiency is approximately 82% with boiler operating at 125% rating. Operation over extended periods indicates good average economy.

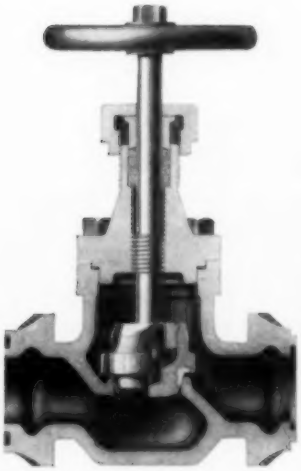
◆ BRIDGE CRANE ASSEMBLY KIT, costing less than $100, may be the answer to your need for a minimum cost crane for serving localized areas, small shops and shipping and loading docks. The Budgit Single Carriage Bridge Crane Assembly kit by Shaw-Box Crane & Hoist Div. of Manning, Maxwell & Moore, Inc., Muskegon, Mich., can be installed on a locally purchased bridge I-beam in less than two hours. Five holes drilled in each end of the I-beam permit bolting the two trolleys provided to the ends of the beam.

◆ NEW TWIST IN RADIANT HEATING—6000 ft of Crane plastic pipe were used in the radiant heating system of a large bus maintenance and repair shop. Engineers set 3/4" plastic pipe on 18" centers in parking area; on 12" centers in working area; and 1/2" pipe on 9" centers in the office area. Details are reported in Valve World, publication of the Crane Co.

Installation was easy—plastic pipe was unrolled and fastened to a wire mesh over a gravel base. Air pressure was maintained in the piping while it was being covered by 4" of concrete. Only fittings required were polystyrene insert-type adaptors to tie plastic pipe into the headers. Only tools used by two-man crew were a saw to cut the pipe and a screwdriver to tighten the metal adaptor clamps. Two men did the job in four days.

◆ NON-FLAMMABLE HYDRAZINE—Hydrazine has found limited application in boiler feedwater treatment for several years, but handling precautions necessitated by its flammability have confined its use principally to large consumers such as generating stations. Successful use at Duke Power Company was reported in SPI for December, 1955, pages 46-47.

Scav-Ox, a new non-flammable form of hydrazine (35% solution of hydrazine in water), has been marketed by Olin Mathieson Chemical Corporation. It has no flash point and no fire point, yet retains all of the advantages of hydrazine as an oxygen scav-



Frick valves have high-angle seats and oversized stems, are good for various high-pressure jobs.

Time-tested

Valves and Fittings

Are preferred for cooling systems using ammonia, Freon, or other refrigerants—as well as for high-pressure work in many industries. Full line of sizes, 1/4" through 14". Handle pressures of 300 to 1500 lbs., according to size. Flanged and screwed types, offering many exclusive advantages.

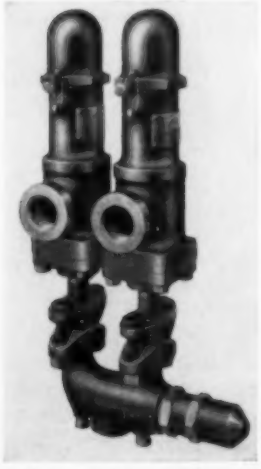
Stocked by Frick Distributors in principal cities, the world over. Write now, on your letterhead, for new loose-leaf catalog, which gives prices, weights, dimensions, parts lists, allowable pressures and useful tables.

Flanged angle valve having seal-cap, for use with Freon.

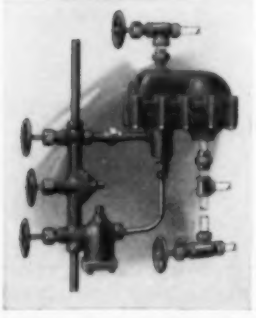
DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

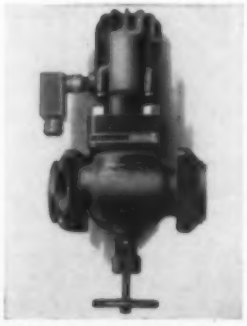
WAYNESBORO, PENNA. U.S.A.



Two safety valves mounted above a dual-outlet valve.



Float valve controls and bypasses, in a range of types and sizes.



Electric control valves, in sizes 1" to 2½".

Get this new catalog by writing today.

Facts and trends *(continued from page 4)*

enger and corrosion inhibitor. Development makes possible use of the chemical in low pressure heating boilers.

◆ FIRST MAGNETIC SLIP COUPLINGS to provide adjustable speed for high pressure boiler feed pumps operating above 3600 rpm will be installed by South Carolina Electric & Gas Company at it new Silas G. McMeekin Station near Irmo, South Carolina. Three 2500 hp, 1800 rpm drives have been ordered from Electric Machinery Mfg. to drive 500 rpm, 2793 psi pumps thru 1:3,045 step-up gears.

High speed boiler feed pumps have been developed in recent years to provide the higher design pressures required in modern steam plants. Conventional 3600 rpm pumps (highest speed available with 60 cycle, direct connected motors), require extra stages to develop the necessary pressure. As a result, they are relatively large and costly. The high speed pump, however, develops more head per stage, therefore has fewer stages and a shorter, more reliable shaft.

◆ COMPACT GAS TURBINE—1130 Bhp gas turbine—The Mark TA—recently introduced by Clark Bros. Co., Olean, New York, offers special advantages and economies for portable power generation, centrifugal compressor drives, pump drives and power generation with heat recovery—lightweight, air cooling, fuel flexibility, compactness, accessibility, and minimum foundations.

Unit, weighing only 6 tons, is well suited to stationary or portable power generation, to marine and industrial mechanical drives, and to processes where power is required and where the exhaust energy can also be used for pre-heating or for the generation of steam—refining, petrochemical, process and manufacturing plants requiring both power and heat.

Gas turbine is air cooled and self-contained. Design permits full load within two minutes after initiating starting cycle. No cooling water is required. Bulletin 142 covers design features, performance data,typical applications, etc.

◆ SNAKE DOPE—Poisonous snakes are widespread . . people still die from snake bites . . snakes can't hear . . rattlesnakes don't always rattle a warning . . alcohol (either internally or externally) is no snake bite remedy. These points and a wealth of helpful information are contained in a new 50 page "Snake Bite Manual" available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. for $1.50 per copy.

If you have to send workers into off-road terrain, such as drilling, pipeline work, lumbering, maintenance, etc., here's some good dope on safe practices, protective clothing, and step-by-step first aid treatment.

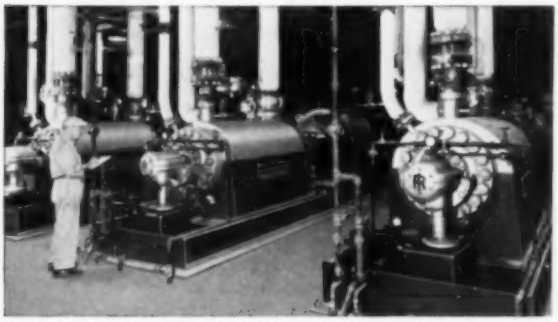
◆ SUGGESTIONS PAY OFF at Oklahoma Gas & Electric Co. Because he was convinced that a construction elevator was a good idea, S. N. Swanson of OG&E's Construction Department is richer by $300. For some time Pete Swanson had been stressing the advantages of an elevator in plant construction work. There was considerable waste time when workers had to walk up to their work locations and back. Temporary ladders offered hazards.

When OG&E's Riverbank project got underway, the company purchased an elevator that met all safety requirements. It is estimated that approximately 174 man-hours daily were saved on the job. Elevator was recently moved to the new Horseshoe Lake project.

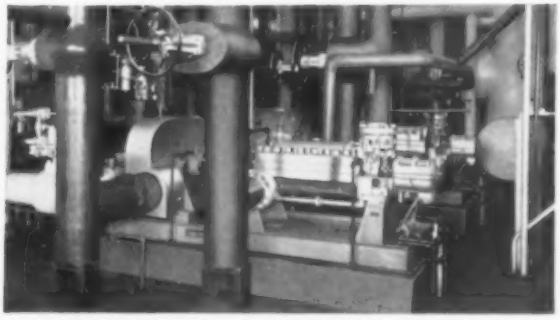
BOILER FEED PUMPS GIVE DEPENDABLE PERFORMANCE

at all pressures, capacities, temperatures.

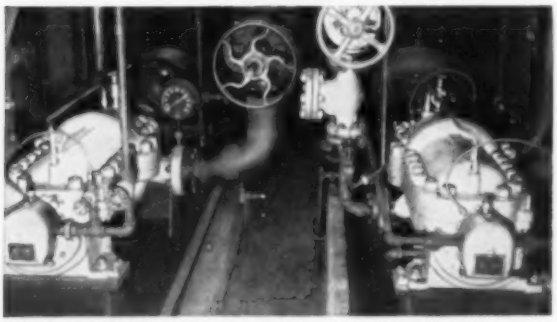
Typical I-R installations indicate wide range of use in central stations and industrial plants



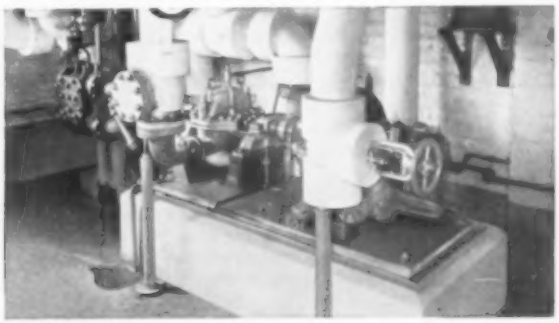
PRESSURES UP TO 6500 psi.—Class CHTA-CHTB: These multi-stage, cylindrical "double-case pumps meet the most exacting needs of the highest-pressure boilers in modern central station service. Each of the above pumps handle 1100 gpm of feedwater at 2395 psi.



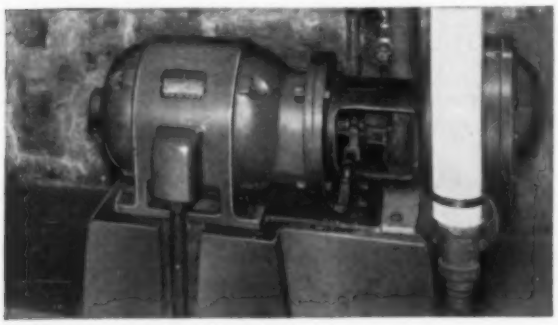
PRESSURES UP TO 1200 psi.—Class HMTA-HMTB: A complete line of multi-stage centrifugal pumps featuring a symmetrical, horizontally-split casing, and a simplified unit-type rotor assembly. The pumps illustrated are on boiler feed service in a large textile mill.



MEDIUM PRESSURES UP TO 1000 psi.—Class CNTA: Symmetrical design with unit-type rotor gives CNTA pumps higher efficiency, easier maintenance, and attractive modern appearance. Installed in a large paper mill, the boiler feed pumps shown operate at 3560 rpm and deliver 180 gpm at 605 psi.



PRESSURES TO 450 psi.—Class GT: Dependability is designed into this line of two-stage, horizontally split pumps. Standard construction includes renewable wearing rings and water-cooled, ring-oiled bearings. Pump shown serves as a boiler feed unit in a large candy factory.



PRESSURES TO 250 psi. — Motorpumps: A complete line of space-saving centrifugal pumps, including both close-coupled and cradle-mounted types. Single , two-stage, and vertical four-stage models are available. Pump shown is handling boiler feed in a leather factory.

Ingersoll-Rand boiler feed pumps have many refinements in design and construction that add up to high operating efficiency. Skilled manufacture and painstaking factory inspections assure dependability built into every pump. Inherent simplicity and ruggedness mean easier and less maintenance—and trouble-free performance.

Whatever pressure or capacity you need, Ingersoll-Rand can supply a boiler feed pump for the job. I-R engineers will gladly help you select the pump that meets your needs.

Ingersoll-Rand

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The Booming South and Southwest . . .

New Plants — Expansions

√ Manufacturing Plants
√ Utility Plants
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Highlights for September, 1956

South Atlantic

$2,000,000 citrus processing plant underway for **Tree-Sweet Products Co.** at **Fort Pierce, Fla.** . . .**Tropical Glass & Box Co.** planning a $200,000 warehouse expansion at **Jacksonville, Fla.** . . . October will see the completion of **Union Bag & Paper Corp's.** corrugated sheet plant at **Lakeland, Fla.** . . . 50,000 sq ft **General Electric Co.** plant planned for **Largo, Fla.** for producing electronic equipment for AEC . . . Plans underway for $2,000,000 brewery at **Orlando, Fla.** for **National Brewing Co.** . . . **St. Regis Paper Co.** effecting plans for $330,000, 20,000 sq ft pulp and paper laboratory at **Cantonement, Fla.** . . . Late 1958 production anticipated for **American Cyanamid Co.'s** $27,000,000 Creslan manufacturing plant at **Pace, Fla.** . . . 100,000 sq ft expansion to its **Tampa, Fla.** can plant planned as part of a $27,000,000 nationwide expansion program of **American Can Co.** . . . $719,177 sewage treatment plant underway at **West Palm Beach, Fla.**

Ga. Power Co. to add 75,000 kw electric generating unit to Plant McManus at **Brunswick, Ga.**—completion of the $13,000,000 unit scheduled for mid-1959 . . . $1,000,000 chemical plant underway at **Brunswick, Ga.** for **Olin Mathieson Chemical Corp.** . . . **Weston & Brooker Co.** erecting a multi-million dollar stone crushing plant at **Macon, Ga.** . . . Multi-million dollar tufting mill—Rabun Mills, Inc.—being constructed at **Rabun Gap, Ga.** by **James Lees & Sons Co.**

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

$30,000,000 expansion at **Baltimore, Md.** planned for **Glidden Co.'s** Adrian Joyce titanium dioxide plant.

Plans underway for **Delmar Studios'** $600,000 plant at **Charlotte, N. C.** . . . **J. W. Wood Co.** to erect a $250,000 elastic webbing plant at **Shelby, N. C.**

Deering-Milliken Co. to construct a 100,000 sq ft cotton warehouse, costing $400,000, at **Spartanburg, S. C.**

$150,000 warehouse addition underway at **Richmond, Va.** for **Manchester Board & Paper Co.** . . . **Virginia Electric & Power Co.** planning a multi-million dollar service center in **Richmond, Va.** . . . $2,750,000 **Stanley Furniture Co.** plant underway at **Stanleytown, Va.** with completion scheduled for May, 1957 . . . A dam and hydroelectric power plant is planned by **Appalachian Electric Power Co.** for **Smith Mountain Gap, Va.**—to cost $20,000,000.

Hope Natural Gas Co. effecting plans for $2,000,000 gas compressor station at **Churchville, W. Va.** . . . Multi-million dollar unit for producing polyethylene plastics underway at **Charleston, W. Va.** for **Carbide & Carbon Chemicals Co.**

East South Central

National Pool Equipment Co. will erect a $500,000 manufacturing plant at **Florence, Ala.** . . . **Gadsden Water Works and Sewer Board** effecting plans for $6,000,000 sewer program at **Gadsden, Ala.** . . . Plans underway at **Huntsville, Ala.** for **American Machine & Foundry Co.** and **Mason & Hanger-Silas Mason Co., Inc.'s** underground plant . . . 1957 will see the initial production of 10,000 tons annually of magnesium from the $7,000,000 magnesium plant at **Selma, Ala.** for **Ala. Metallurgical Corp.** . . . $25,000,000 Aluminum Castings Plant for **Ford Motor Co.** will be completed in June in **Sheffield, Ala.**

$5,000,000 iron ore sintering plant underway at **Ashland, Ky.** for **Armco Steel Corp.** . . . **International Business Machine** erecting a $4,000,000 electric typewriter manufacturing plant at **Lexington, Ky.** . . . $3,000,000 electrical equipment plant planned by **Square D Co.** at **Lexington, Ky.**

Brookhaven, Miss. will be the home of a $900,000 ceramic tile mfg. plant for **Misceramic Tile.** . . . **Miss. Pulp & Paper Co.** constructing a $30,000,000 Kraft Pulp & Paper Mill at **Columbus, Miss.** . . . $50,000,000 paper mill underway at **Meridian, Miss.** for **Marathon Corp.**

(*More on Page* 12)

COMPLETE LINES OF WALWORTH VALVES for POWER PLANT SERVICE

Featuring Walworth Pressure-Seal Valves

Here are cast steel valves built for high-pressure, high-temperature service. The unique bonnet-to-body design utilizes internal line pressure for a tight, leakproof connection. The higher the pressure the tighter the bonnet joint! Bulky, heavy bonnet flanges, bonnet studs, and nuts are completely eliminated providing a modern valve design of truly streamlined proportions. Maintenance is simplified as Walworth Pressure-Seal Valves are easily assembled, disassembled, and insulated.

Walworth Pressure-Seal Valves are available in Series 600, 900, 1500, 2500, and in a wide range of sizes and types. Complete information is available from your nearby Walworth Distributor—or—write Walworth for for a free copy of Circular 16.

and including these valves for "*'round-the-plant*" use!

WALWORTH SMALL CAST STEEL Y-GLOBE VALVES. Simplified design eliminates many of the problems encountered in high-temperature, high-pressure service. No bonnet joint. Improved back-seat design means longer life for packing rings.

WALWORTH LUBRICATED PLUG VALVES. Easy turning—quick operating. Lubricant can be renewed while the valve is in service. Lubricant completely surrounds the plug ports for a tight seal against leaks. Remember, always use Walworth Lubricant in Walworth Lubricated Plug Valves.

WALWORTH BRONZE VALVES. Standardized lines of bronze valves provide an unsurpassed system of interchangeability of parts, drastically reducing inventory problems. Walseal Valves with brazing ends also available in a variety of types.

WALWORTH IRON BODY GATE VALVES. Straight-flow port design reduces fluid turbulence to a practical minimum. Seat rings of end-seated type are screwed into the body. Brass liner on glands assures greater resistance to corrosion and scoring. Available with threaded or flanged ends.

WALWORTH CAST STEEL GATE VALVES. Bolted bonnet, wedge gate, OS&Y. Bonnets and bodies are engineered to withstand pressure and minimize distortion. Heavy steel walls provide extra strength and longer life. Deep stuffing boxes in all sizes (2" to 24") insure tightness and maximum packing life. Also available in globe and angle types.

WALWORTH also offers Plastic Valves, Fittings, *and* Pipe of polyvinyl chloride, moulded to Walworth's specifications by General American Transportation Company of B. F. Goodrich Chemical Company Geon!

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Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

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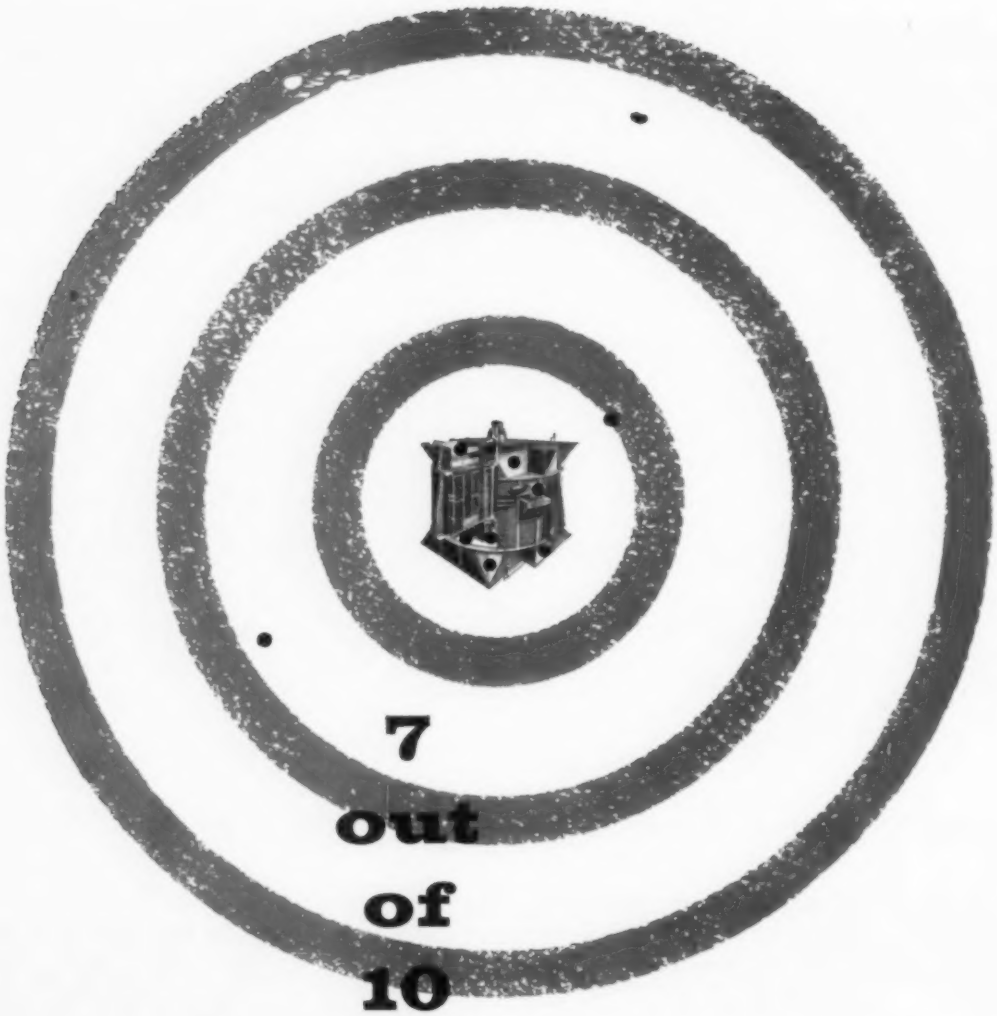
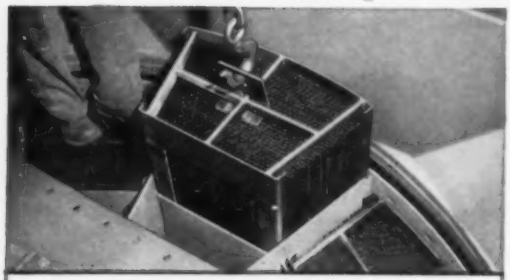


7 out of 10

air preheater installations are Ljungstrom®



Advantages of the Ljungstrom Air Preheater

- Size for size, recovers more heat than any other type.
- Reduces fuel consumption. Permits use of lower-grade fuels. Increases boiler output and reliability.
- Eliminates cold spots...keeps corrosion to a minimum.
- Easier, faster to clean and maintain.
- Requires far less supporting steel and is quickly erected.

MINIMUM CORROSION is an important reason. There are no cold spots in a Ljungstrom. Temperature is uniform on all heating surfaces—corrosion-causing condensation is reduced.

For all the facts, send now for a free copy of our 38-page manual.

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

How it Works!

Only new Sarco TD steam trap uses kinetic energy of steam to close valve

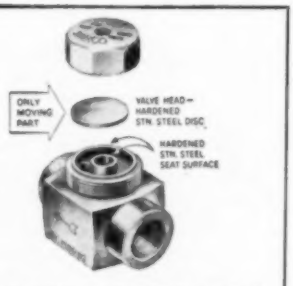
GAS MANTLES have been replaced by electric lights, steam locomotives by diesels, propeller planes by jets.

Now, the use of the kinetic energy of steam principle gives us a modern type steam trap.

The Sarco TD obsoletes all other types for 10 to 600 psi installations. For example, it operates without a valve closing device—no bucket, float, bellows, pins, levers or gaskets.

Glance below and you'll agree that no other steam trap is even similar to the Sarco TD!

For a trial installation—write today.



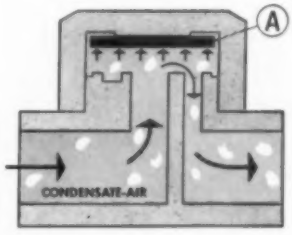
Only 3 parts... all stainless steel

Sizes ⅜ to 1"—each body is as small as a tee fitting! Capacity is determined not by a bulky body but by the effective orifice, valve action, pressure drop and condensate temperature.

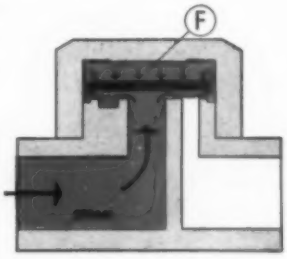
Many Advantages

1. *Practically no maintenance*—no valve mechanism, no narrow channels. Trouble-free simple design. Only 3 parts—all stainless steel.
2. *One trap for all pressures*—self-adjusting. One large capacity seat for 600 psi as for 10 psi. No changes or adjustments.
3. *Operates equally well on all loads*—on heavy, light or no condensate load. No prime to lose. No adjustments.
4. *No steam leak required*—to operate the Sarco TD. Closes tight against steam.
5. *Discharges at steam temperature and vents air* and air-steam mixtures at start-up and during operation.
6. *Freeze-proof*—when installed with outlet down, free to drain.

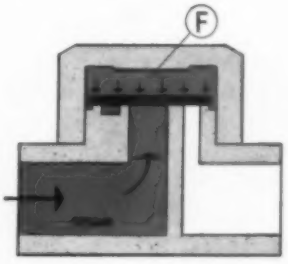
Only Sarco TD Thermodynamic Steam Trap Uses This Unique Operating Principle Which Permits Trouble-Free TD Design



1. Inlet pressure raises disc "A" from seat... immediate discharge of air and condensate at steam temperature.



2. Steam follows the condensate and the high velocity jet across the bottom of disc "A" creates a low pressure area (Bernoulli effect)... the jet is deflected into chamber "F" where it builds up pressure by recompression and this pressure acts on the top of the disc "A"...



3. Pressure in chamber "F", acting on full top area of disc "A", exceeds force of incoming steam and low pressure area under the disc... and immediately forces it down, closing the inlet. As condensation decreases the pressure in chamber "F", the disc rises and steps 1 or 2 repeat.

60-day trial convinces... No obligation... Use coupon!

SARCO

Steam Traps—Temperature Regulators—Strainers—Heating Specialties

SARCO COMPANY, INC., Empire State Bldg., New York 1, N. Y.

Please send me Sarco TD Steam Trap and strainer for 60-day trial. Size_____

For installation on_____

Name_____ Title_____

Firm_____

Address_____

City_____ State_____

2184-C

West South Central

$1,000,000 glass container plant underway at **Jonesboro, Ark.** for **Ark. Glass Corp.** . . . **International Paper Co.** erecting a $57,000,000 newsprint and paperboard mill at **Pine Bluff, Ark.** . . . **Hudson Pulp & Paper Corp.'s** Hammond Bag & Paper plant at **Pine Bluff, Ark.** being expanded at a cost of $299,000.

Plans underway for $300,000 **Coca-Cola** plant at **Alexandria, La.** . . . Multi-million dollar vinyl chloride monomer mfg. plant planned at **Baton Rouge, La.** for **Ethyl Corp.** . . . **Copolymer Rubber & Chemical Corp.** effecting plans for $2,000,000 expansion of its synthetic rubber plant at **Baton Rouge, La.** . . . $1,000,000 high speed tubing and pipe mill—**P & H Tube Corp.**—under way at **Bossier City, La.** . . . **Eunice, La.** will see the erection of a $6,000,000 natural gas processing plant by **Texas Gas Exploration Corp.** and **Union Oil & Gas Corp.** . . . $12,000,000 ammonia synthesis plant planned for **Petroleum Chemicals, Inc.** at **Lake Charles, La.** . . . **Chemoil Corp.** to erect a $20,000,000 refinery at **New Orleans, La.** . . . $2,600,000 power plant, distribution system and fresh water pumping station planned for **Thibodaux, La.**

$1,500,000 plant planned for **Container Corp. of America** in **Muskogee, Okla.** . . . **Webster Engineering Co.** to erect in **Tulsa, Okla.** a $275,000 plant.

Milk processing plant costing $550,000 underway in **Abilene, Tex.** for **Borden Co.** . . . $7,500,000 anhydrous ammonia plant planned in **Chillicothe, Tex.** for **Chillicothe Petrochemicals, Inc.** . . . January, 1957 will see the beginning of the $7,000,000 power plant, J. L. Bates Power Station, in **Mission, Tex.** for **Central Power & Light Co.** . . . $5,426,000 gasoline plant underway in **Goldsmith, Tex.** for **El Paso Natural Gas Co.** . . . **Southern Pine Lumber Co.** planning a $4,000,000 fiber board plant at **Diboll, Tex.** . . . **Houston, Tex.** to be the home of the $350,000 manufacturing plant for **Nifty Tablet Mfg. Co.** . . . Multi-million dollar petrochemical plant planned by **Warren Petroleum Corp.** for **Houston, Tex.** . . . $25,000,000 catalytic unit to process 55,000 barrels of oil daily underway in **Baytown, Tex.** for **Humble Oil & Refining Co.** . . . **International Furniture Co.** to double its output with an expansion at **Jacksonville, Tex.** costing $380,000. . . . $1,000,000 mfg. plant underway at **Longview, Tex.** for **Garrett Oil Tools, Inc.** . . . February, 1957 is scheduled completion date for the $500,000 expansion of **Acheson Dispersed Pigments Plant** in **Orange, Tex.** . . . Multi-million dollar expansion program for **Neches Butane Products Co.'s Port Neches, Tex.** plant to be begun this month . . . **Flintkote Co.** is constructing a multi-million dollar gypsum processing plant in **Sweetwater, Tex.** . . . $6,000,000 expansion of **Lone Star Steel Co.'s** Germany works planned in **Lone Star, Tex.**

Kansas and Missouri

$3,000,000 generating station expansion underway for **Western Light & Telephone Co.** in **Dodge City, Kans.** . . . **Monarch Cement Co.** planning a $6,500,000 expansion program in **Humboldt, Kans.**

North American Refractories Co. effecting plans for $1,250,000 expansion in **Farber, Mo.** . . . $3,000,000 warehouse being constructed in **St. Louis, Mo.** for **Kroger Co.** . . . **Vaisey-Bristol Shoe Co.** erecting a $375,000 factory building in **Monett, Mo.**

FUTURE EVENTS
of Engineering Interest

Sept. 14-15; 38th Annual Meeting, **Public Utilities Association of the Virginias,** Greenbrier Hotel, **White Sulphur Springs, W. Va.** Estimated attendance 400.

Sept. 14-15; 32nd Fall Conference, **Maryland Utiliites Association,** Cavalier Hotel, **Virginia Beach, Va.**

Sept. 20-21; Engineering & Operation Section Conference, **Southeastern Electric Exchange,** John Marshall Hotel, **Richmond, Va.,** J. W. Talley, Exec. Dir., 711 Haas-Howell Bldg., Atlanta 3, Ga.

Sept. 23-26; Petroleum-Mechanical Engineering Conference, A.S.M.E., Conrad Hilton Hotel, **Dallas, Texas;** C. E. Davies, Secty., A.S.M.E., 29 West Thirty-Ninth St., New York 18, N. Y.

Sept. 27-29; 33rd Annual Meeting, **National Management Association,** Sheraton-Jefferson Hotel, **St. Louis, Mo.** National Management Assoc., 321 West First St., Dayton 2, Ohio.

Sept. 28; Oklahoma Regional Meeting, **Natural Gasoline Association of America,** Skirvin Hotel, **Oklahoma City, Okla.** William F. Lowe, 421 Kennedy Bldg., Tulsa 3, Okla.

Oct. 1-3; 12th Annual Meeting, **National Electronics Conference,** Hotel Sherman, **Chicago, Ill.** Estimated attendance, 10,000, for the nation's leading forum on electronic research, development and application. Victor J. Danilov, Illinois Institute of Technology, Chicago 16, Ill.

Oct. 15-17; Northeast Region, **National Association of Corrosion Engineers,** Drake Hotel, **Philadelphia, Pa.** Symposia on protective coatings, metals and alloys, cermets and plastics and the use of statistical methods. A. B. Campbell, Executive Secretary, National Association of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Tex.

Oct. 22-25; Society of Industrial Packaging and Materials Handling Engineers technical short course (Oct. 22-25), 11th Annual National Protective Packaging and Materials Handling Exposition (Oct. 23-25), and National Protective Packaging and Materials Handling Competition. Kiel Auditorium, **St. Louis, Mo.;** G. Cornwall Spencer, 30 N. La Salle St., Chicago 2, Ill.

Oct. 22-26; 44th National Safety Congress and Exposition, Chicago, Ill. Sessions on industrial safety scheduled for Conrad Hilton, Congress, Morrison and La Salle hotels; traffic safety sessions, Congress; commercial vehicle and transit safety sessions, La Salle; farm and school sessions, Morrison; and home safety sessions, Conrad Hilton. R. L. Forney, secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Oct. 23-26; Symposia are planned on utilities industry, high temperatures, transportation industry, cathodic protection, pipe lines and oil and gas well equipment; **National Association of Corrosion Engineers,** South Central Region, Gunter Hotel, **San Antonio, Texas;** A. B. Campbell, Executive Secretary, National Assoc. of Corrosion Engineers, 1061 M & M Building, Houston 2, Texas.

Oct. 26; Southern Regional Meeting, **Natural Gasoline Association of America,** Captain Shreve and Washington-Youree Hotels, **Shreveport, La.** William F. Lowe, 421 Kennedy Bldg., Tulsa 3, Okla.

Nov. 26-30; Third International Automation Exposition, Trade Show Building, 500 Eighth Ave., **New York.** Clinics on: electronic computers, process automation, machine tool automation, office automation, automatic materials handling (conveyors), servomechanisms, electromechanical components and electronic components. Harrison Gilmer, 908 Keystone Building, Pittsburgh 22, Pa.

Nov. 26-30, 1956; 22nd National Exposition of Power & Mechanical Engineering in **New York City's** new **Coliseum.** Covers power production, its use, new techniques, economies, and atomic energy; under auspices of ASME; Management—E. K. Stevens, Pres., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 30; Panhandle-Plains Regional Meeting, **Natural Gasoline Association of America,** Herring Hotel, **Amarillo, Texas,** William F. Lowe, 421 Kennedy Bldg., Tulsa 3, Okla.

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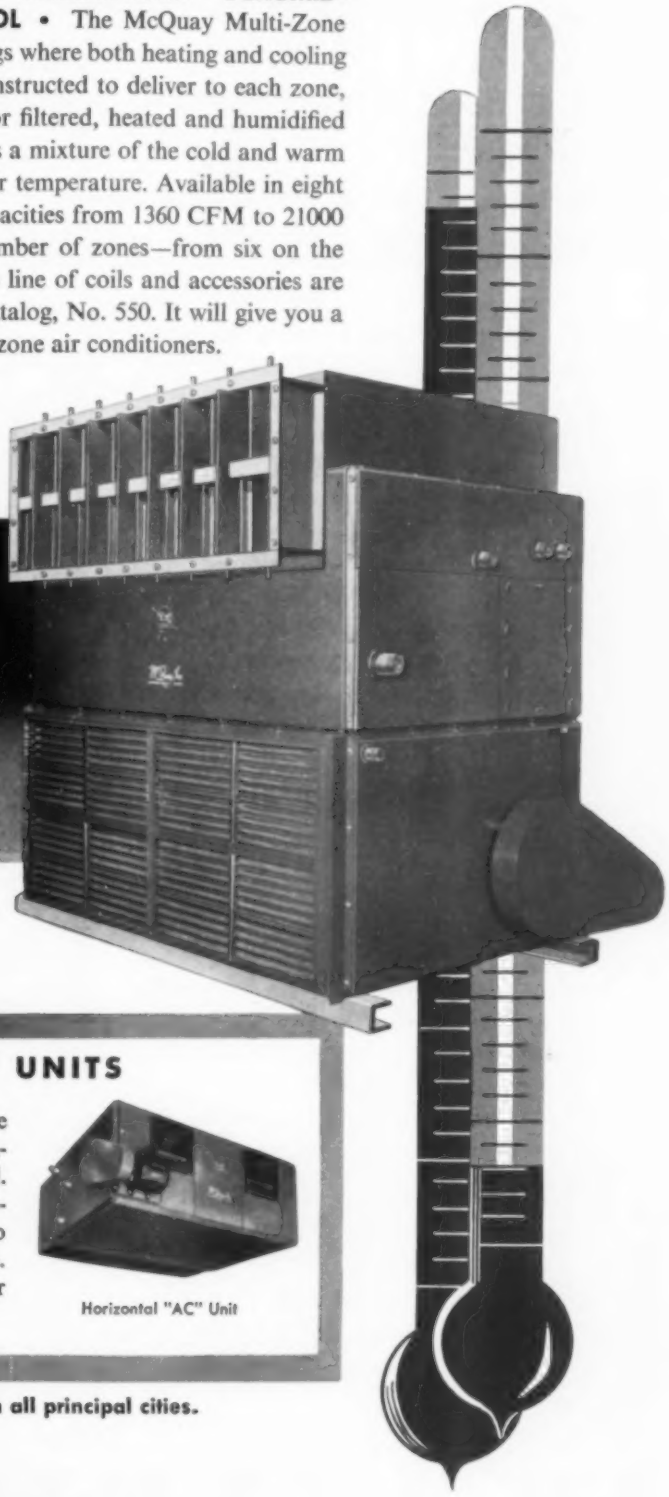

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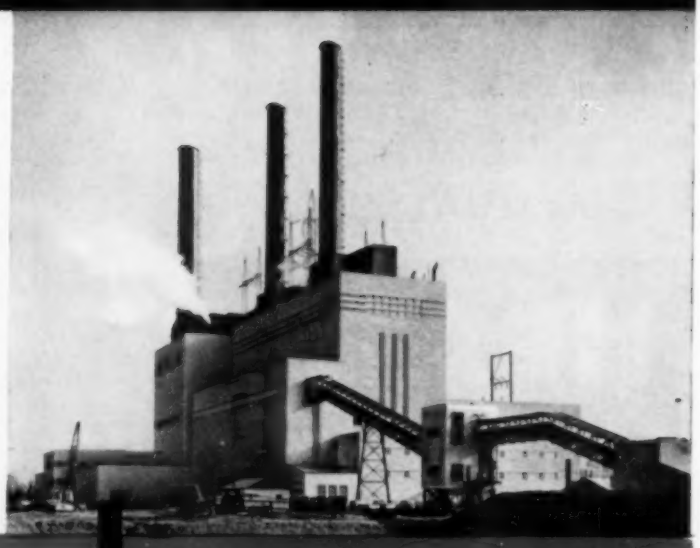

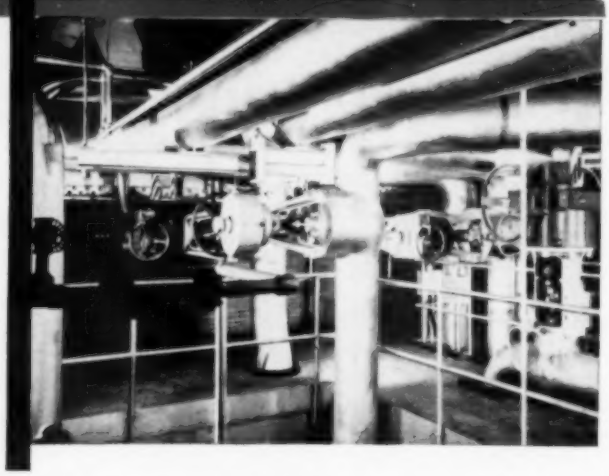

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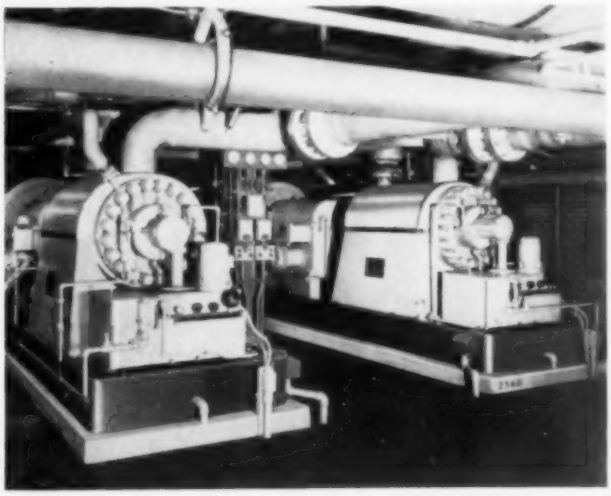

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

5—Turbine Generators — 1500 to 15,000 kw range covered in 35 p Bulletin 1960C-P. Types, applications, construction, and typical installations are featured.—WORTHINGTON CORPORATION.

8—Small Gas Turbine — Compact, 1130G, Bhp Gas turbine (The Mark TA) described in 28 p Bulletin 142 offers advantages and economies for power generation, centrifugal compressor drives, pump rives and power generation with heat recovery. Lightweight, air cooling, fuel flexibility, accessibility and minimum foundations among features.—CLARK BROS. CO.

9—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

11—Feedwater Treatment—Bulletin describes liquid and dry (Braxon & Flako) boiler feedwater treatment recommended for removal and prevention of scaling and corrosion during use of many types of water and for prevention of foaming and carryover. — ANDERSON CHEMICAL CO.

15—Stokers — Bulletin covers complete line of underfeed coal stokers and units for profitable disposal of wood waste; illustrated case studies; meet any city's smoke ordinance. — McBURNEY STOKER & EQUIPMENT COMPANY.

25—Packaged Boilers — New bulletin PSG-2 shows construction details and table of capacities, dimensions and weights for nine sizes of units. — HENRY VOGT MACHINE CO.

48—Boiler Tubes—Booklet describes complete stock of boiler tube sizes and gauges for any make boiler; spares when you need them; specialty bending for any need.—BOILER TUBE CO. OF AMERICA.

51—Steam Generators — Catalog 811 describes 18 sizes from 20 to 600 Bhp for fully automatic operation burning oil, or gas, or both; pressures to 250 psi; 80% thermal efficiency guaranteed. — SUPERIOR COMBUSTION INDUSTRIES INC.

56—Water Tube Boilers — Booklet — Describes details of stoker — oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel. — QUEEN CITY ENGINEERING CO.

76—Gas Burner — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing — in a horizontal plane through fire doors or small openings over handfired coal grates or stokers — or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY.

88—Industrial Burners — General Bulletin 751, 16 pages — Describes and illustrates industrial oil burners, gas burners, combination gas and oil burners for boilers, dryers, stills, retorts, kilns, etc., and fuel oil pumping and heating units which go therewith. — NATIONAL AIROIL BURNER CO.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

110—Deaerator — Publ. 4651 describes design that eliminates tubular vent condensers without impairing efficient purging of noncondensible gases. Unit handles wide range of operating conditions.—COCHRANE CORPORATION.

112—"Packaged" Fans — Catalog 515 shows how Clarage V-belt Ready Units economically answer your smaller air handling requirements. 18 sizes, wheel diameters 9¾ to 32½", capacities to 12,000 cfm. Direct connected units also available. —CLARAGE FAN CO.

126—Centrifugal Pumps — Bulletin 7248A covers new DMV-DHV single-stage line for general hydraulic service; double mechanical shaft seals eliminate stuffing box maintenance; sizes from 3 to 6 in. with heads to 350 ft & capacities from 250 to 2400 gpm. — INGERSOLL-RAND.

138—Steam Pump Maintenance — Bulletin G-2280 P, 23 pages, "How to Install and Take Care of Steam Pumps" gives 28 tips on proper installation and 54 tips on field-proven care techniques. — WORTHINGTON CORPORATION.

144—Fluid Drives — Catalog, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp. — AMERICAN BLOWER CORPORATION.

152—Stainless Steel Pump — Bulletin 725.4 describes pump for economical handling of hot, corrosive or abrasive liquids; 9 sizes with capacities up to 720 gpm; heads to 200 ft. — GOULDS PUMPS INC.

158—Submersible Pumps — 12 p bulletin covers four basic pump types; handy selection chart, units range from 5 to 900 hp and from 30 gpm capacity to 30,000 gpm and above.—BYRON JACKSON PUMPS, INC.

167—Rotary Pumps — Bulletin 307—Describes the features and advantages, and outlines the engineering details of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts. — BLACKMER PUMP CO.

170—Heat Exchangers — Bulletins 120 & 124 describe Aero units which cool liquids & gases by evaporative cooling with atmospheric air, removing heat at rate of input, and precisely controlling temperature. Solves problems of water availability, quality or temperature. — NIAGARA BLOWER CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

204—Floatless Level Control — Data sheets PC-37 describe control that is unaffected by surface agitation and equipment vibration. Simple, compact, one adjustment unit.—LESLIE CO.

211—Fluid Control Valve — Bulletin CV-1 describes "Bellofram" construction where no force is lost at end of the stroke where spring compression requires maximum force. Sizes start at ½".—FOSTER ENGINEERING COMPANY.

222—Pressure Regulators — Catalog 76 — Gives complete detailed information covering applications, operation and specifications of Reducing Valves, Pump Pressure Regulators and Back-Pressure Regulators. Included is a simple, practical method for selecting size of regulators.—MASON-NEILAN DIV.

224—Precision Relays — Bulletin MRM 240 describes new high limit and low limit action relays for alarm signalling and on-off operation of electrical loads. — MANNING, MAXWELL & MOORE, INC.

225—Cooling Controls — Self-powered controls for compressors, stills, solvent coolers, degreasers, small engines, etc., described in Bulletin 710B; operational and hook-up sketches.—SARCO COMPANY, INC.

240—Temperature Control — Bulletin 316 describes Accritem regulator for controlling water heaters, heat exchangers, and processes. Use where pressure and load conditions fluctuate widely and for control of large size valves. — THE POWERS REGULATOR COMPANY.

265—Pressure Alarms to 2500 lb — Steam whistles available on water columns up to 900 psi only. But with the Levalarm EA17 you can have vibratory horns or warning lights or both, to assist Eye-Hye in water level "watch dog" service. — THE RELIANCE GAUGE COLUMN CO.

290—Small-Size Gauges & Receivers — Bulletin V5 covers new line of easy-to-read gauges and receivers which save panel space, make more compact groupings and still get accuracy and dependability. Five inch illuminated scales; multiple or individual mounting — draft, pressure & vacuum, differential pressure, temperature. — REPUBLIC FLOW METERS CO.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

300—Cast Iron Welding—Data sheets describe the new Xyron 2-25 strontium-aluminum bearing electrode for crack-free welding of gray and ductile cast iron, including Meehanite, Ni-Resist, and for joining cast iron to steel. — EUTECTIC WELDING ALLOYS CORP.

305—Industrial Heating — Catalog 50, 50 pages — Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications.—EDWIN L. WIEGAND CO.

306—Steel Buildings — Catalogs cover Series S buildings (clear span widths from 4-40 ft) featuring Steelox panel construction; and Series P buildings (clear-span widths up to 100 ft); fire resistant & weather tight; simplified design eliminates much job-site labor. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

334—Electric Power Hammer — Drilling, routing, cleaning, caulking, chipping are among many maintenance and construction applications described in Bul. 5199. Drills holes up to 1⅛" in diameter; 2300 blows per minute; weighs only 12 lb, 13 oz. — INGERSOLL-RAND.

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495	502	512	583	595	596	597	601	607	608	613
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Also send further information on following New Equipment (page 100).

I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11
I-12	I-13	I-14	I-15	I-16	I-17	I-18	I-19			

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351—Steel Grating & Treads—Bulletin 2486 describes electroforged steel grating and treads, their advantages and typical successful applications.—BLAW-KNOX EQUIPMENT DIVISION, BLAW - KNOX COMPANY.

384—Floor Grating — Catalog No. AT254 — Describes company's free planning and checking service for completely custom fabricated floor grating installations.—BORDEN METAL PRODUCTS CO.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

402—Forged Steel Valves—32 page supplement of Catalog F-9 covers new general purpose gate, globe and angle valves for 150-800 lb service. Featuring hard faced seating surfaces.—HENRY VOGT MACHINE CO.

403—Valve Operators—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

408—Wide-Range Valves — Data Sheet 10-5 covers the "Point 4 Factor Trim" — answer to those few types of applications where reduced capacity trim is desirable. Available in V-port and solid turned designs for double or single seated valves and in wide variety of material.—MASON-NEILAN DIV.

425—Steam Trap with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressures 10-600 psi. — SARCO COMPANY, INC.

429—Expansion Joints—Bulletin EJ-1914 describes Gun-Pakt slip-type joints which give long life—no fatigue failures; packing may be added as necessary, under full steam pressure right on the job—no unpacking, no shutdowns.—YARNALL-WARING COMPANY.

430—Check Valve — Catalog 30A highlights the "tilting disc" check valve for handling fluids or gases under wide range of pressures. —THE CHAPMAN VALVE MFG. CO.

433—Renewable Seat Ring Gate Valve — Bulletin V-123 shows how you can replace seat rings in less than 10 minutes with valve body still installed in the line. 200 lb valves available in sizes ½" thru 2".—THE FAIRBANKS COMPANY.

443—PVC Fittings & Flanges—Corrosion resistant polyvinyl chloride pipe fittings & flanges covered in 12 p catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc.—GRINNELL COMPANY, INC.

451—Air Relief Traps — Bulletin No. 2062 — Describes application of ball float traps for venting air from hot water heating systems, water service lines, etc. Hook-up drawings, prices included. — ARMSTRONG MACHINE WORKS.

493—Unions & Valves — Complete company line of pipe unions and check valves covered in Catalog 56. New Four-Star lug nut unions & spring controlled check valves included.—CATAWISSA VALVE & FITTINGS COMPANY.

495—Blow-Off Valves — Bulletin E-125 describes design and construction of quick-operating valves, angle valves, Y valves and duplex units specifically designed for boiler blow-off service. — EVERLASTING VALVE CO.

(*Continued on Page 20*)

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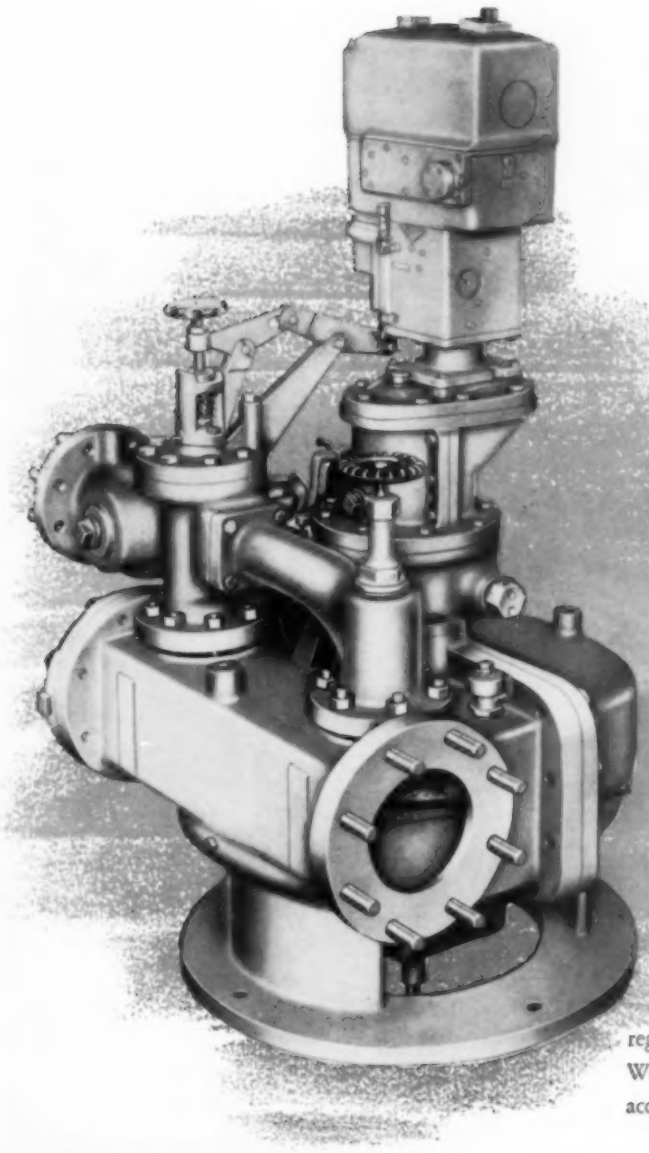

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(*Continued from Page 18*)

MAINTENANCE PACKING GASKETS, LUBRICATION

502—Hazardous Liquid Gasket Material — How type 662 gaskets can stand varying climatic conditions without drying, shrinking, or hardening described in Bulletin AD-146. For use against gasoline, water and oil at temperatures up to 300 F. Has Underwriters' Laboratories, Inc. approval. — THE GARLOCK PACKING COMPANY.

512 — Lubricator Vacuum Type Pumping Unit. — If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the new 82 vacuum pumping unit will offer lower costs. Form 1263 gives principal of operation and advantages.—MANZEL.

583—Condensate Corrosion — Bulletin No. 35, 4 pages—Describes the causes of condensate corrosion in return lines, heaters, tanks and describes methods of stopping it with various Nalco products. Well illustrated. — NATIONAL ALUMINATE CORP.

595—Plant Lubrication — The Lubriplate Service Handbook — Gives valuable information on the subject of lubrication in all its forms, intended to be of everyday use to plant superintendents, managers, maintenance engineers and those in charge of plant production and maintenance. — LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO.

596—Tube Cleaners & Expanders — Catalog 77 covers tubes in high pressure boilers, superheaters, economizers and other heat exchange equipment. Model 38 expander rolls and flares in single operation. — THOMAS C. WILSON, INC.

597—Facing Material provides superior sealing surface for mechanical seals — Data sheet describes the Dura Seal No. 55 Facing Material recommended for use in sealing all chemicals with exception of hot strong caustics and some fluorine compounds. — DURAMETALLIC CORPORATION.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

601—Fluid Drive — Bul. 9819 describes features of improved Type T Gyrol Fluid Drive for general industrial applications. Applications and advantages noted; rating charts give hp ranges for various engine and electric motor drive speeds. — AMERICAN BLOWER CORPORATION.

607—Variable Speed Drives — with touch control described in Bulletin 1600-B7 P. 1/3 thru 5 hp Allspeed drives offer simple maintenance, minimum of repair parts, easy operator control, and flexibility. — WORTHINGTON CORPORATION.

608—Conveyor Belt Repairs — Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made.—FLEXIBLE STEEL LACING COMPANY.

613—MONORAIL APPLICATIONS — Bulletin C-1 — "Handling Problems Solved" — gives hundreds of illustrations of monorail applications to handling problems in various industries. Equipment advantages also illustrated.—AMERICAN MONORAIL CO.

631—Screw Conveyors—Catalog ID-541, 68 pages — Illustrates and describes standard and special types of conveyors, with engineering data necessary for selection. Tables give sizes, types, speeds, horsepowers and other information. Accessories included. — CONTINENTAL GIN COMPANY, INDUSTRIAL DIVISION.

649—Hydraulic Aerial Ladders — Catalog outlines features of Series 2100 all-hydraulic ladder, which rotates 360 degrees, reaches up to 40 ft in the air and elevates to 75 degrees.—J. H. HOLAN CORPORATION.

694 — Stock Roller Chains and Sprockets — Catalog No. 754, 66 pages — Describes and illustrates Stock roller chains and sprockets including minimum and finished bore, ready - to - use TaperLock bushed sprockets, as well as chain selection and application data. — DIAMOND CHAIN COMPANY, INC.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

708—Cooling Tower Drives — Catalog CT-53 — Gives information on the use of gear reduction drives for cooling tower applications—includes worm gear units, spiral-bevel units and helical-spiral-bevel units. Gives construction and operating details, with illustrations and selection data.—PHILADELPHIA GEAR WORKS.

709—Heating & Ventilating Units— 17 sizes in "HC" Line described and illustrated in Catalog 344. Air deliveries from 1,280 cfm to 32,500 cmf; Heating capacities from 26,200 Btu/hr to 2,227,000 Btu/hr. — McQUAY, INC.

710—Scale Remover—Bulletin shows how Anco Scale Remover quickly eliminates scale in boilers, water lines, refrigeration and air conditioning systems—ANDERSON CHEMICAL COMPANY.

712—Ion Exchange Equipment — Bulletin A-255 describes the various methods of ion exchange treatment which provide suitable boiler feedwater, process water, and purified solutions. — ILLINOIS WATER TREATMENT CO.

721—What Type Collector?—Reprint 102 discusses control of industrial dusts and flyash and features P-D Collector Systems.—THE THERMIX CORPORATION.

735—Refrigerating Machine—Bulletin 1426 describes the Tonrac single - stage hermetic centrifugal refrigerating machine, which maintains constant chilled-water temperature regardless of load. Single level construction simplifies installation.—AMERICAN BLOWER CORPORATION.

757—Demineralization — Reprint T-140, 24 p, discusses advantages and disadvantages of this process for today's power plants. Developments, trends, applications; case studies; flow sheets and performance curves. —GRAVER WATER CONDITIONING CO.

ELECTRICAL

800—Cords & Cables — Bronco 66 Certified electrical cables described in new brochure. Electrical cords & cables made with 66% Neoprene jacket — WESTERN INSULATED WIRE CO.

838—Electric Power Drives — Scale Drawings, 22 sheets—Illustrate and describe geared, electric power drives for design engineers, draftsmen and layout engineers. Three views are detailed on each sheet with the frame and type drawn to three separate scales, from ½ hp to 30 hp capacity. — STERLING ELECTRIC MOTORS, INC.

841—Applying Electric Heat — "101 Ways to Apply Electric Heat"—Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained—EDWIN L. WIEGAND CO.

852—Autotransformer Starter—with air break contacts up to 75 hp, 220 v; 150 hp, 440-550 v is described in Bulletin 646. Silver alloy contacts stay in good condition without filing, cleaning or dressing. — ALLEN-BRADLEY.

855—Wirewound Resistors — Catalog 101—Describes power type fixed wirewound resistors manufactured in accordance with the requirements of Military Specification MIL-R-26B—gives complete series of standard resistor values and maximum permissible currents.—SPRAGUE ELECTRIC COMPANY.

871—Electrical Protection — Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simpified form. Designed to help the electrical or plant maintenance engineer. — BUSSMANN MFG. CO.

FACT: The new Life-Line A has stronger insulation than any motor on the market

Meaning what? Simply that the new Westinghouse Life-Line® "A" motor with new *fortified insulation* can withstand heavier overloads and operate at higher temperatures than any other motor you can buy. That's electrical system improvement!

There are equally important advances in the Life-Line "A" mechanical and lubrication systems. It takes the right combination of *all three systems* to build industry's most preferred "power package".

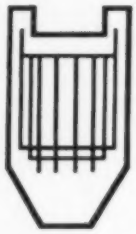
Get all the facts from your Westinghouse sales engineer —The Man With The Facts. J-21894-A

YOU CAN BE SURE... IF IT'S Westinghouse

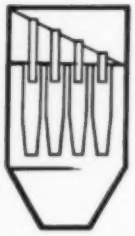
The industry's most experienced organization in dust, fume and fly ash recovery

—as near as your telephone!

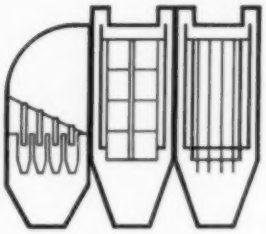
Because the Western Precipitation Corporation stands alone in its years of continuous leadership in the complex science of recovering suspensions from industrial gases, Western Precipitation installations, quite naturally, are recognized throughout the world as the best obtainable. . .



● Almost a half-century ago — in 1907 to be exact — Western Precipitation installed the first commercial application of the now-famous Cottrell Electrical Precipitator — and has more know-how, more varied experience and application background in world-wide installations in this type of equipment than any other organization, domestic or foreign.



● Many years ago Western Precipitation was first again with the multiple small-diameter tube type of cyclonic collector — the type with higher centrifugal forces for greater recovery efficiencies. And through the years, Western Precipitation engineers have continuously led in new advancements, new refinements in the *mechanical* recovery field as well as in *electrical* recovery methods.



● Western Precipitation was the first to combine Electrical and Mechanical recovery advantages in one compact, coordinated system—the CMP (Combination Multiclone — Precipitator) Unit. This equipment, offering almost constant collection efficiency despite varying gas volume, requires years of experience in both electrical and mechanical recovery methods for proper operating "balance".

. . . only Western Precipitation has had such extensive experience in basic recovery methods!

These are only a few of the many important reasons why a Western Precipitation installation is recognized as the best obtainable. This unequalled know-how is quickly available throughout the major industrial areas of the United States and Canada from strategically-located, fully-staffed offices and field representatives, as shown at right. There's one as near as your telephone.
So before you finalize any dust, fume or fly ash recovery plans, be sure to find out the vital *extra* advantages offered by Western Precipitation Corporation!

For literature describing Western Precipitation's unique background of experience and advancements, phone, wire or write our nearest office.

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Reverse-Jet Filters
HOLO-FLITE Processors

Western Precipitation Corporation

Designers and Manufacturers of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

***Main Offices:* 1052 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA**

Chrysler Building, New York 17 • 1 North La Salle Street Building, Chicago 2 • Oliver Building, Pittsburgh 22 • 3252 Peachtree Road N. E., Atlanta 5 • Hobart Building, San Francisco 4

Precipitation Company of Canada Ltd., Dominion Square Building, Montreal

Representatives in all principal cities

5 Industries . . . Well-Known Companies

. . . typical of more than 100 companies for whom Grinnell is currently fabricating

POWER AND PROCESS PIPING

CHEMICALS
NATIONAL ANILINE DIVISION OF ALLIED CHEMICAL & DYE CORP., Hopewell, Va.

PULP & PAPER
UNION BAG & PAPER CORP., Savannah, Ga.

POWER
PENNSYLVANIA POWER & LIGHT COMPANY, Allentown, Pa.

BEVERAGE
CARLING BREWING COMPANY, Natick, Mass.

OIL REFINING
TIDEWATER OIL COMPANY, Delaware City, Del.

These successful companies, leaders in their respective fields, are building new facilities right now. The power and process piping needed in this construction is being fabricated in Grinnell shops.

In fact, at this time — or at any given time, more than one hundred similar-type orders for prefabricated piping are being worked on by Grinnell. Why this marked preference by so many companies for Grinnell?

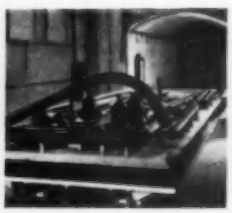
Because piping fabricated in Grinnell shops is done under ideal conditions, with modern equipment, by personnel qualified for each class of work. Included in the price (which is determined in advance) are such items of expense as: interpretive engineering, shop sketches and planning, procurement of materials, power services, expendable tools and supplies. All piping is rigidly inspected and tested to comply exactly with customer specifications and applicable codes. Consult Grinnell on your next piping job.

ATTENTION: *A 30-minute color sound film showing the quality and economy of Grinnell Shop Fabrication of all classes of piping is available for group showings.*

GRINNELL
WHENEVER PIPING IS INVOLVED

Pipe being heated to exact temperature required for proper bending

Skilled team completes bend in six minutes with pipe close to 2000°F



Fabricated piping, bending operation completed, enters stress-relieving furnace

Heavy wall pipe being machined to the proper welding bevel on a post mill

Ultrasonic testing of a weld on heavy wall pipe

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

POSITIVE PROTECTION
AT ANY PRESSURE...
specify Consolidated

Get protection you can be sure of — whatever your working pressure. Specify Consolidated Safety Valves. Thousands of installations, in both large and small steam generating plants, attest to their complete reliability under all types of service conditions.

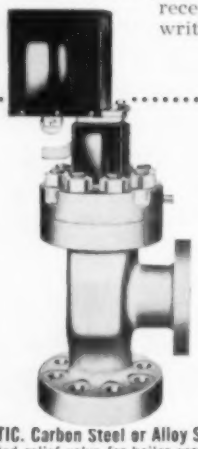
Many Consolidated Valves, with bronze body, are widely used for steam, air and water service; many more are installed in power plants as auxiliaries to Consolidated Steel Safety Valves. The cast iron and steel types are proving their dependability daily on low pressure boilers and those operated at super-critical pressures. The five different Consolidated Valves pictured here are representative types but the line is so complete, proper selection is no problem.

Consolidated Safety Valves are ruggedly built for long service life. Each type incorporates the fewest possible working parts for greatest efficiency. Precision craftsmanship assures positive, tight closing after operation. Through skillful engineering, valve adjustment and maintenance are made simple and easy. All these essentials contribute to outstanding performance, safety and economy.

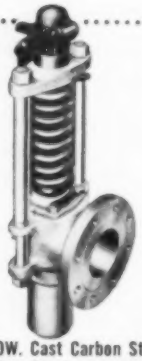
Just send us details of your particular service requirements and you will receive correct valve recommendations. Or write for Catalog 700A.

TYPE 1551. Cast Bronze Body. For package-type and fire tube boilers, air tanks and other classes of unfired pressure vessels. **Sizes:** ¾" through 3". **Pressures:** up to 300 psi. **Temperatures:** up to 450° F.

TYPE 1511. Cast Iron Body. An all-purpose safety valve for steam generator service. Cuts cost per pound of steam discharged. **Sizes:** 1½" through 6". **Pressures:** up to 250 psi. **Temperatures:** up to 450° F.



ELECTROMATIC. Carbon Steel or Alloy Steel. An electrically actuated relief valve for boiler service. Operable automatically, manually or cut out of service by setting remote control switch. Supplements spring-loaded safety valves — conserves power and increases efficiency of steam generating plants. **Sizes:** 2½" through 14". **Pressures:** up to 2500 psi. **Temperatures:** up to 1100° F.



MAXIFLOW. Cast Carbon Steel or Cast Alloy Steel. A safety valve with the greater discharge capacity and shorter blowdown demanded by high pressure, high temperature steam generators. **Sizes:** 1½" through 4". **Pressures:** up to 2500 psi. **Temperatures:** up to 1050° F.

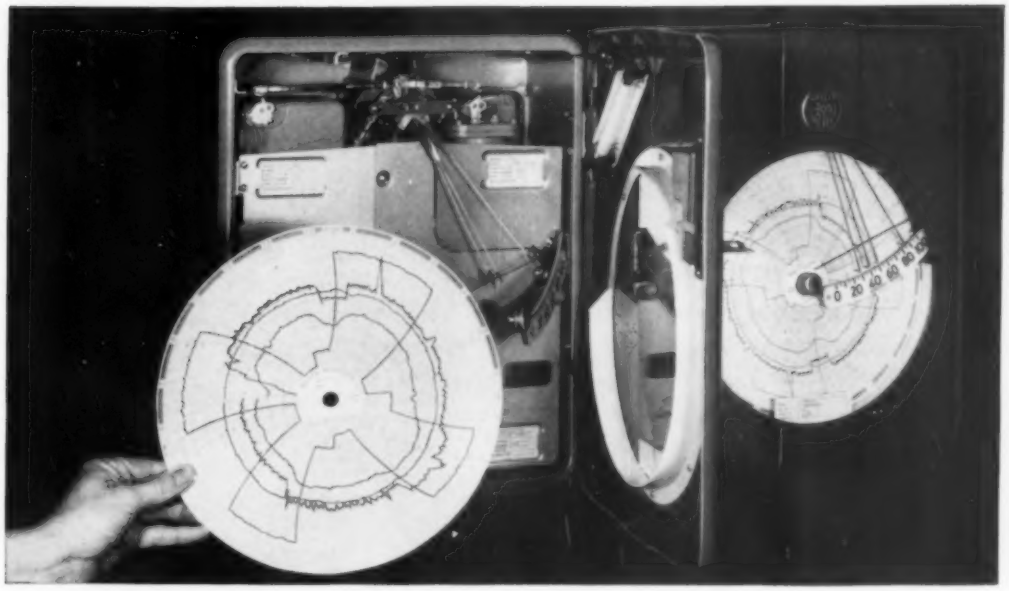
TYPE 1415. Cast Steel Body. For water tube boilers, mechanically fired fire tube boilers, accumulators, unfired pressure vessels and pipelines. **Sizes:** ½" through 6". **Pressures:** up to 900 psi. **Temperatures:** up to 900° F.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario.

CONSOLIDATED SAFETY VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONN.

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, CONSOLIDATED SAFETY VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, *Stratford, Conn.* 'HANCOCK' VALVES, *Watertown, Mass.* 'CONSOLIDATED' SAFETY RELIEF VALVES, *Tulsa, Okla.* AIRCRAFT CONTROL PRODUCTS, *Danbury & Stratford, Conn. and Inglewood, Calif.* "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, *Muskegon, Mich.*



Faithfully yours –

Clear, Continuous Records without Poisoning . . . on the New Bailey Recorder

★ Faithful chart records of measured variables are the key to a meaningful, dependable analysis of operating trends and conditions. Money spent for more accurate metering, for faster response, is money down the drain—*unless* it's matched with chart records that are equally accurate.

That's why these features of the new Bailey Recorder are important to you:

1. Bailey's exclusive sealed capillary-action inking system maintains continuous flow to the pen tip, and traces sharp, opaque, quick-drying records. "Poisoning" of intersecting records is practically eliminated; no blots or smears during operation or chart changing.

2. Pens are mounted on concentric centers, trace on parallel time arcs only 42/1000" apart. This simplifies analysis of two or more records.

3. Interchangeable plug-in receiver units permit practically limitless record-grouping combinations.

Write for Product Specification E12-5 and actual chart sample. P32-1

ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- Pre-calibrated plug-in receiver units
- Up to four pneumatic or electronic receivers —or two receivers and two integraters
- Any four variables on one chart—easily read and interpreted
- A full year's ink supply at one loading
- Faster shipment—from stock
- Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration

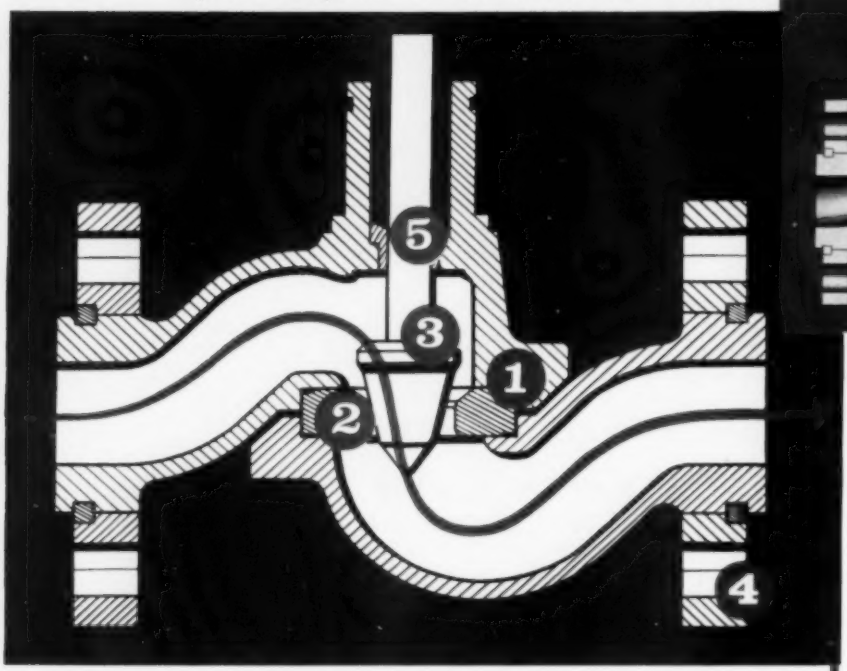
BAILEY METER COMPANY
1028 IVANHOE ROAD
CLEVELAND 10, OHIO
Controls for Power and Process

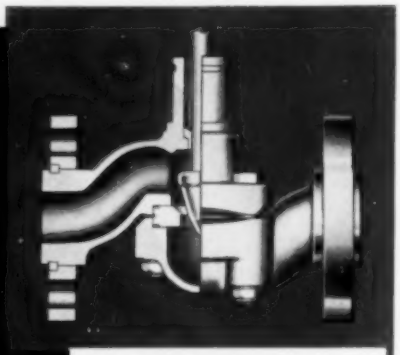
BAILEY METERS
Controls for
TEMPERATURE
PRESSURE
GAS ANALYSIS
FLOW · LEVEL
RATIO · DENSITY

ANNIN BODY DESIGN

...THE SOUNDEST APPROACH TO TROUBLE-FREE FLUID CONTROL

Reduces body turbulence and erosion • Longer seat ring life—retains tight closure • High lift in all sizes for better control—greater rangeability • Fewer parts—simplified and much lower maintenance.



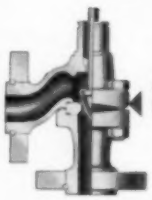


GLOBE BODY ▲

The basic form of all Annin Valves. Reduces number of parts 50 to 75%, lowers initial costs, saves on parts inventory and maintenance.

OTHER BODY DESIGNS PROVIDE FLEXIBILITY IN INSTALLATION

CORNER BODY ▶



ANGLE BODY ◀

3-WAY VALVE-ANGLE ADAPTER ▶

3-WAY VALVE-GLOBE ADAPTER ◀

Annin Valves are the answer to the complex fluid control problems common in the process industries—Chemical, Petroleum, Paper, Steam, Power Plants, and many others. Today, Annin Valves are recognized by control engineers and valve designers as the outstanding valve development of the past twenty-five years for the control of hot, cold, erosive, or viscous liquids.

• • •

Annin's complete line of control valves will be on display in booths 1408 and 1409, 11th Annual Instrument-Automation Conference and Exhibit.

1 BODY. Single seat split body construction eliminates pockets and shoulders... reduces erosion.

2 SEAT RING. The body flanges retain seat in perfect alignment with valve plug.

3 VALVE PLUG AND STEM. Valve plugs are contoured to provide either linear, percentage, or semi-throttle characteristics... reduce turbulence, wire drawing, plug vibration and noise.

4 SEPARABLE FLANGES. Can be interchanged at will. Carbon steel flanges can be mounted on alloy bodies for economy.

5 PLUG GUIDE. Hard metal guides of close tolerances can be inserted through stuffing box without resorting to threads, welding, pressing or staking.

ANNIN THE ANNIN COMPANY
6570 EAST TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA
Control VALVES

The completed SPANG CW Steel Pipe radiant-heating system at Green Machinery Company is covered with cement flooring. Nearly 30,000 ft. of 1-in. and 1¼-in. SPANG Pipe went into this job.

Another steel pipe radiant-heating system . . . installed with SPANG CW!

All three of Green Machinery Company's new buildings at Plainview, Texas, are warmed by a SPANG CW Steel Pipe radiant-heating system. Buried in the concrete floor, the pipe grids distribute an even, thermostat-controlled heat throughout the buildings where the famous Green Pumps and other irrigation equipment are manufactured. A 25 hp boiler serves the radiant-heating system.

Easy installation

SPANG CW Steel pipe's *quality-controlled* manufacturing provides easy, time-saving installations. SPANG CW is uniform throughout, has a strong weld, is easy to cut, bend, thread and weld. That's why it's preferred by plumbing and heating contractors everywhere for practically every type of installation.

Long service life

Quality-control processing builds long years of service into every foot of SPANG CW Steel Pipe. Careful attention to temperatures, forming and welding pressures produce in SPANG CW that extra quality that means extra service on the job. Testing and inspection eliminate any pipe that does not meet SPANG's high standards.

Buy it and try it!

Prove to yourself how easy SPANG CW Steel Pipe is to work with . . . how it can save you installation time! See your nearby SPANG Distributor for your next pipe order.

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Offices: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

Green Machinery's new main building includes offices, engine shop, assembly department, testing laboratory and stock room. Other two buildings house welding shop and storage rooms. All are heated by a SPANG radiant-heating system.

All the features you asked for make 1956

RM* Medium Transformers

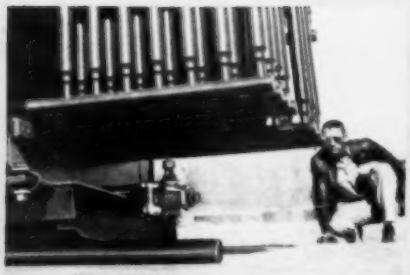
Your Best Buy

For further information on G-E Medium Transformers, contact your nearest G-E Apparatus Sales Office, or write Section 416-6, General Electric Company, Schenectady 5, N. Y.

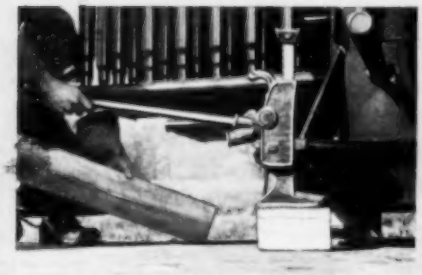
*Repetitive Manufacture

Progress Is Our Most Important Product

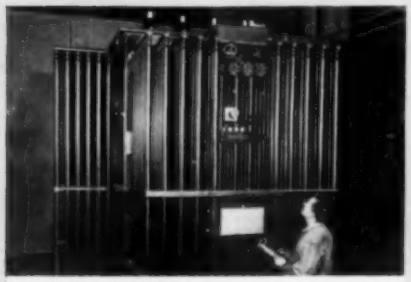
GENERAL ELECTRIC



SLED-RUNNER BASE on all G-E RM transformers slides easily or rides smoothly over rollers, makes installation simpler. Wide face on I-beam will not cut rollers.

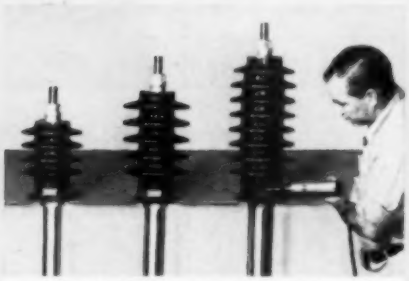


LIBERAL JACKING SPACE cuts installation time and effort. Minimum of 5½ inches between jackpad and ground provides more-than-adequate clearance for most jacks.

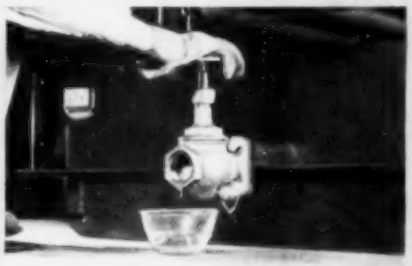


CONTROL CENTER groups all instruments and nameplate in one easy-to-see area; improves visibility, makes readings extra simple. Chances of error are reduced.

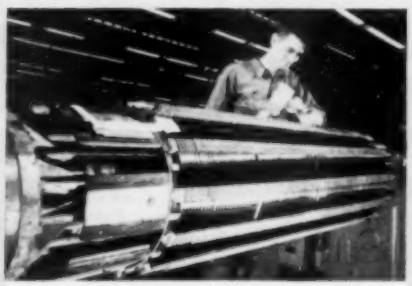
PROTECTED ACCESSORIES are recessed behind cooling tubes, sheltered against damage from blows that might be encountered during shipping and installation.



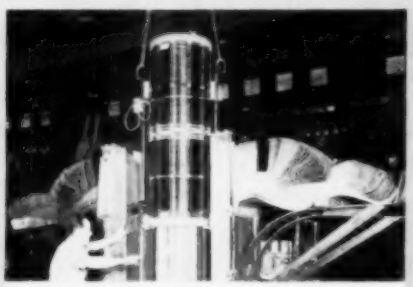
AMERICAN STANDARD BUSHINGS, used on all General Electric Repetitive Manufacture Medium Transformers, enable you to reduce your bushing inventories.



FULL DRAIN permits complete filtration, removes worst bottom oil. Sampling is more accurate, since sample is drawn from region of greatest contamination.

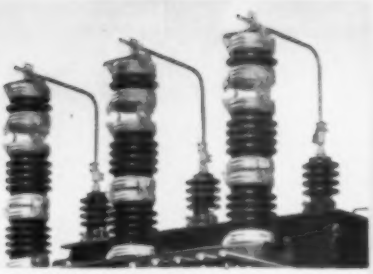


FORMEX* insulation is extremely rugged, has phenomenally high dielectric strength. Permits more compact, lighter RM transformers. *Reg. Trade-mark G.E. Co.



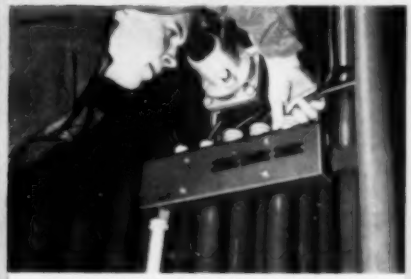
PRE-FORMED CORE, used in single-phase RM medium transformers, reduces core losses since magnetic flux path follows grain in core laminations, even at corners.

VENTILATED BASE permits free air circulation, helps prevent moisture from condensing under transformer, minimizes rusting and corrosion in this hard-to-reach area.



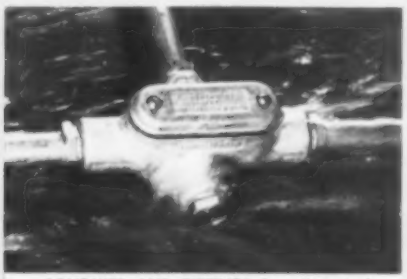
PRE-FITTED CONNECTORS between bushings and G-E Magne-valve lightning arresters simplify field installation, give better lightning protection.

REVERSIBLE JUNCTION BOX readily adapts to overhead or underground system, simplifies ordering and interchangeability, provides additional flexibility.



ONE CONTROL CONDUIT simplifies field wiring of accessories and controls. Connections for entire transformer are made to a single terminal board, shown above.

TILTED INDICATORS. Where control center group is sufficiently high above ground, indicators are tilted at proper angle to make instrument reading easier, more accurate.



CONDUITS AND FITTINGS for all control wiring are weather-tight, can be field assembled in minutes without cutting threads. Cover plate gasket is re-usable Nitrile.

NITRILE GASKETS resist weathering, seal without adhesives; no chipping required for removal. Re-usable again and again, they permit reduction of gasket inventories.

SUPER MELAGLYP FINISH saves up to two repaintings, is longer lasting in corrosive atmospheres. Metal is specially prepared for better adhesion, more uniform coating.

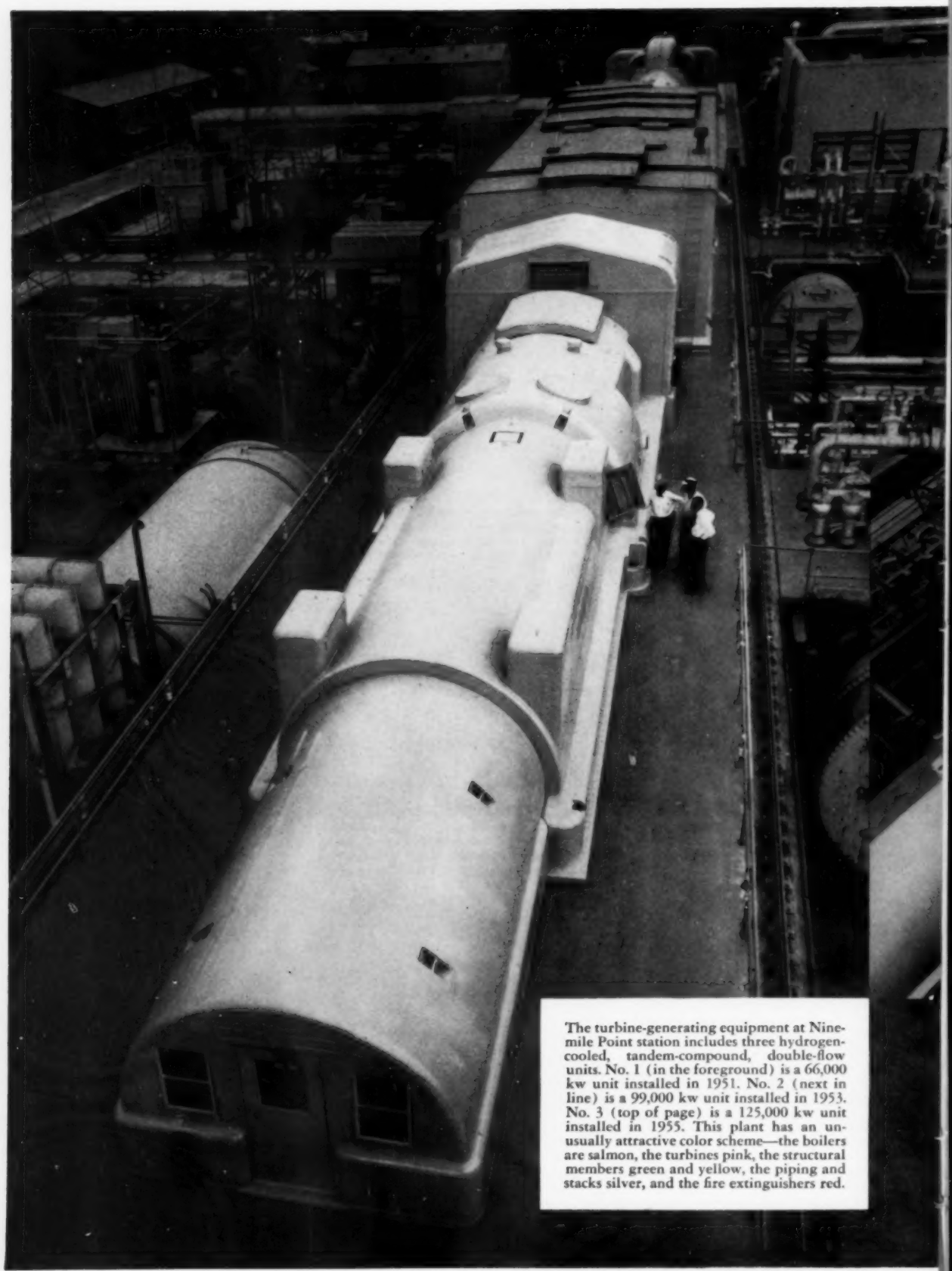
DOMED COVERS let water run off, help prevent dirt and rust from accumulating. Flanges around openings prevent foreign matter or moisture from rolling into tank.

SPRAY-ON PAINT, provided with every RM transformer, permits touching up of spots chipped or scraped during shipment or installation, before rust gets foothold.

WEDGE-TYPE TAP CHANGERS have rugged self-aligning contacts with wedging action to assure line contact. They can carry transformer's full-rated short-circuit current.

LARGER MANHOLES, introduced this year, mean easier accessibility to interior; allow easier and more accurate inspections. Even a husky man has plenty of room.

GENERAL ELECTRIC



The turbine-generating equipment at Nine-mile Point station includes three hydrogen-cooled, tandem-compound, double-flow units. No. 1 (in the foreground) is a 66,000 kw unit installed in 1951. No. 2 (next in line) is a 99,000 kw unit installed in 1953. No. 3 (top of page) is a 125,000 kw unit installed in 1955. This plant has an unusually attractive color scheme—the boilers are salmon, the turbines pink, the structural members green and yellow, the piping and stacks silver, and the fire extinguishers red.

Johns-Manville organizes to give you better insulation service

New and separate insulations division created to provide industry greatly improved Sales and Engineering service to meet modern problems

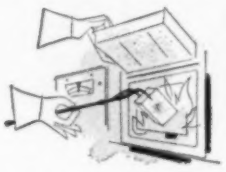
• Johns-Manville is now concentrating all industrial insulation operations within a new, fully integrated insulations division. This greater specialization makes possible the most complete insulation service available to industry. It consists of—

Sales Representatives . . . men on whom you can rely for your insulation recommendations. Your J-M salesman will help you select the insulating material exactly right for your job—the one that will provide maximum fuel savings, improved process control, and minimum maintenance. As co-ordinator of J-M's extensive research-engineering-manufacturing facilities, he offers you outstanding insulation training and experience.

Insulation Engineers—Backing up the J-M salesman on every job is the J-M insulation engineer. He is primarily concerned with solving insulation problems. He recommends the economic thickness of insulation, as well as the proper finishes, weatherproofing and securement. His highly specialized knowledge makes possible an intelligent recognition and handling of your individual insulation requirements.

Insulation Contract Units . . . Fully aware that no insulation is better than the man who applies it, the J-M Insulation Contractor makes care and skill in the scientific application of Johns-Manville insulations his stock in trade. He maintains a complete crew of estimators and mechanics trained in J-M application techniques. He is ready to give you fast, efficient service on any insulation job—large or small. Proud of his reputation for integrity in his own community, the J-M Insulation Contractor merits your complete confidence.

Complete Range of Products—In this day of exacting temperature control, the need for specific insulations for specific services is greater than ever before. Recognizing this, Johns-Manville manufactures insulations for every industrial requirement. Produced from the finest grades of asbestos, magnesium carbonate, diatomaceous silica, refractory clays and ceramic fibers, they are designed to afford maximum insulating effectiveness and durability at operating temperatures ranging from minus 300F to plus 3000F.



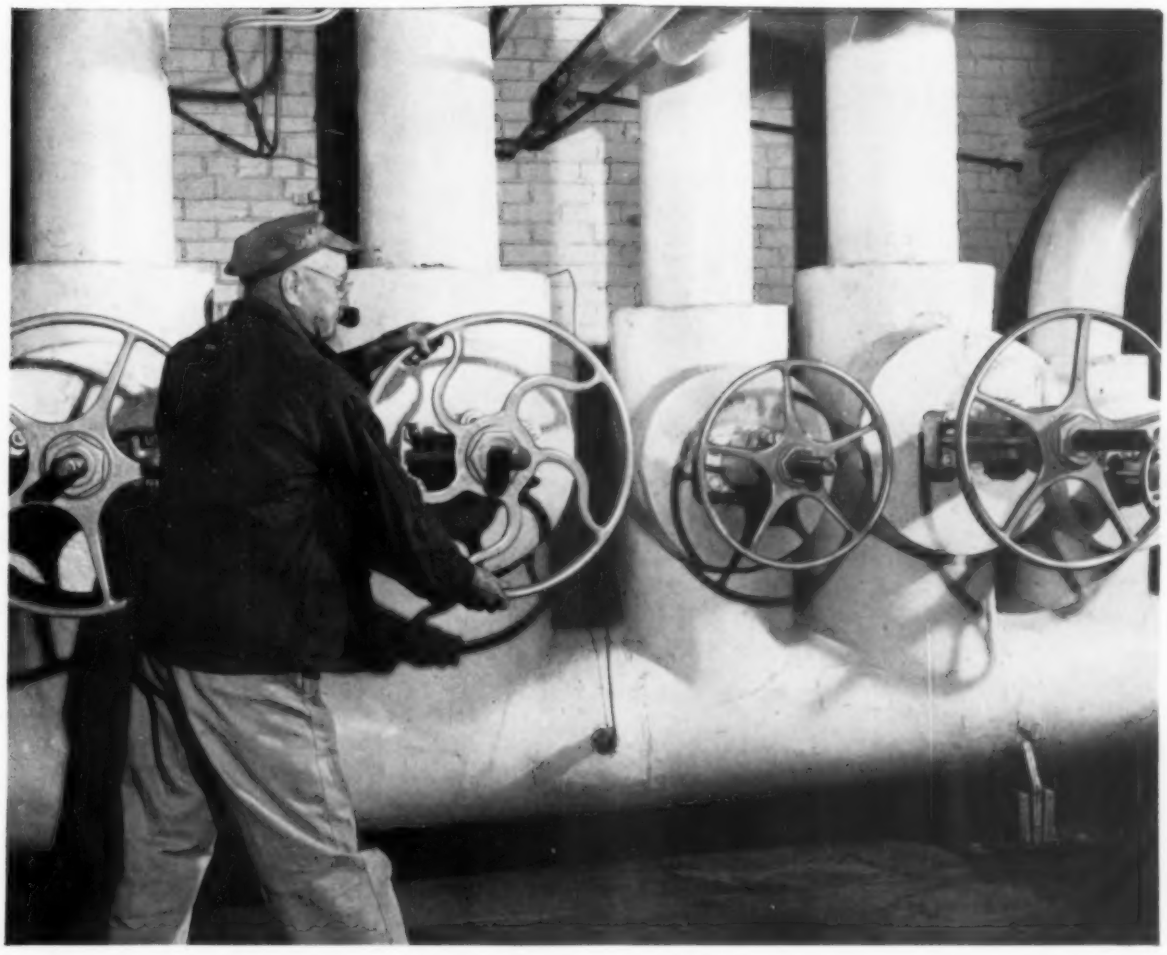
Extensive Research Facilities—At Manville, New Jersey, Johns-Manville maintains the world's most completely equipped insulation laboratory. Here insulation scientists are engaged in a continuous program of developing new and better insulating materials. In addition, their technical knowledge is always available to J-M customers whose insulation problems require special study.

Experienced Management—At headquarters as well as in the field, management of the new insulations division consists of men who, in line with J-M's promotion-from-within policy, are insulation veterans. With a realistic grasp of customers' needs, they are alert to new and better ways to serve you . . . now, and in the future.

On Your Next Insulation Job—Whether your next insulation job is big or little, simple or complex, let Johns-Manville handle it for you. Just call your nearest J-M sales office, or write direct to Johns-Manville, Box 14, New York 16, New York. In Canada, Port Credit, Ontario. *Chances are, you'll be glad you did!*

Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION



20-year veterans—all—
with Crane "one-cost" service records

A CASE HISTORY—What better hedge could a power plant have against high maintenance costs?

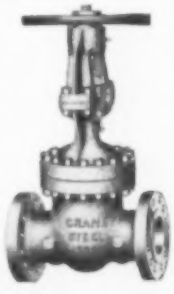
Call it foresight or sound buying practice, the Fort Bend Utilities Co., Sugar Land, Texas, knows the bigger value in quality steel valves. For 20 years now, these Crane 600-pound gates have been operating with no added cost beyond original investment, except for occasional repacking.

The valves are on a main header, with working pressure at 400 psi, 750 deg. F.

As a subsidiary of Imperial Sugar Co., the Fort Bend Utilities plant supplies steam to the neighboring Imperial Sugar refinery through the valve shown being operated. This 8-in. Crane No. 76XR steel gate has to its credit 20 years of faithful once-a-week operation with the refinery's weekend shutdowns. The other valves assure dependable steam control to units in the power plant.

Service records like this result from internal valve quality. They begin with the greater care Crane gives to design, castings, heat treating and machining.

Don't be misled by outside similarity to Crane steel valves. Get the facts from your local Crane Representative or by writing to address below.



CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

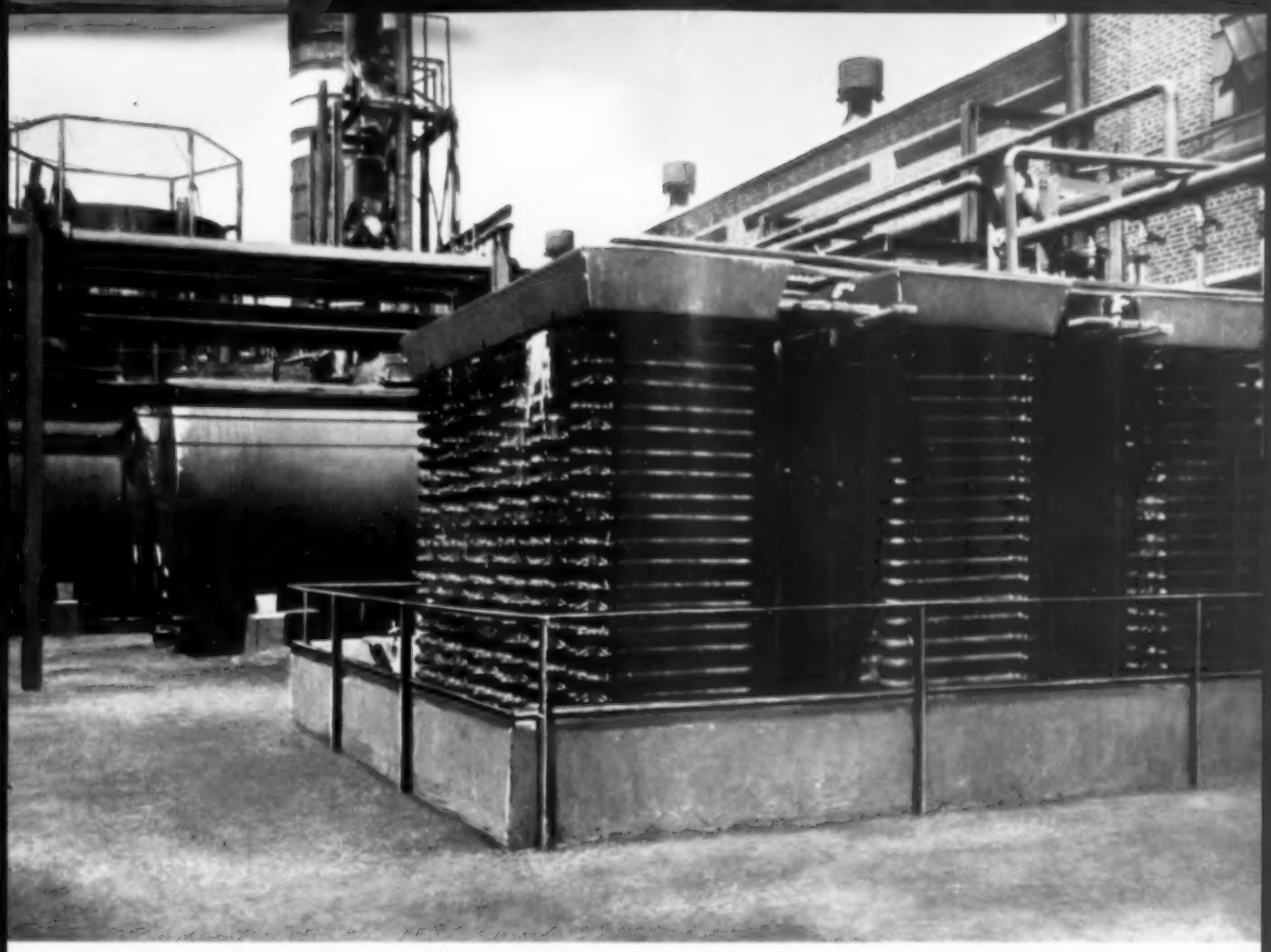
$ $ $ For Your Ideas

SP&I presents each month helpful features, ideas, methods and procedures — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material — a photo or rough sketch will make your idea more valuable.

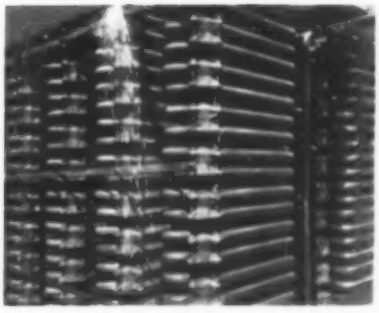
Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 8, Georgia



NALCO blue

that signals CORROSION PREVENTION



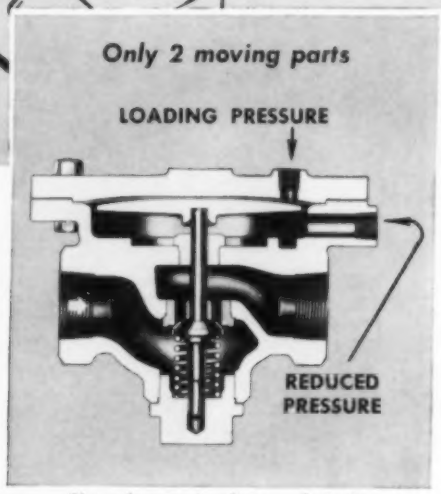
Nalco blue on these exposed cooling unit coils is the visible evidence of effective corrosion prevention at work. Nalco System chemicals used in this installation form a tough protective film of characteristic blue color on all ferrous metal surfaces. The metal is literally sealed off from direct contact with water, air and fumes, yet the film itself will not impair heat transfer efficiency.

Similar Nalco protection for your plant can cut maintenance costs and protect you against unscheduled shutdowns that are frequently caused by damaging corrosion. Call your Nalco Representative for some facts and figures on Nalco System protection and economy.

NATIONAL ALUMINATE CORPORATION
6208 West 66th Place Chicago 38, Illinois
Telephone: POrtsmouth 7-7240
CANADA: Alchem Limited, Burlington, Ontario
NORTHWESTERN UNITED STATES, HAWAII AND ALASKA:
The Flox Company, Inc., Minneapolis 3, Minnesota
ITALY: Nalco Italiana, S.p.A.
WEST GERMANY: Deutsche Nalco-Chemie GmbH
SPAIN: Nalco Espanola, S.A.

THE *Nalco*® SYSTEM . . . *Serving Industry through Practical Applied Science*

Now Leslie brings you this New NO MAINTENANCE* Reducing Valve



This shows simplicity of Leslie Class G-1 pressure reducing valve.

HERE IS AN AMAZINGLY SIMPLE air loaded, diaphragm operated, pressure reducing valve that is virtually maintenance-free for steam heat or process steam application.

Only two moving parts and no seals, no stuffing boxes, no small dirt-catching parts — practically nothing can get out of order! And a stainless steel hardened main valve with highly polished finish minimizes wear.

This new Leslie valve instantly feels the effect of any flow change and responds to changes as small as 0.1 psi. It can be adjusted easily from minimum to maximum of reduced pressure range from a remote point, even a thousand or more feet away.

This valve is used in steam process and heating lines. And, its uses are unlimited for any steam reductions within body material limits (250 psi, 450°F).

Ask your Leslie engineer to tell you more about this amazing valve. He's listed in your classified directory under "Valves" or "Regulators".

guaranteed no maintenance for 3 years.

Send for Bulletin 561 today.

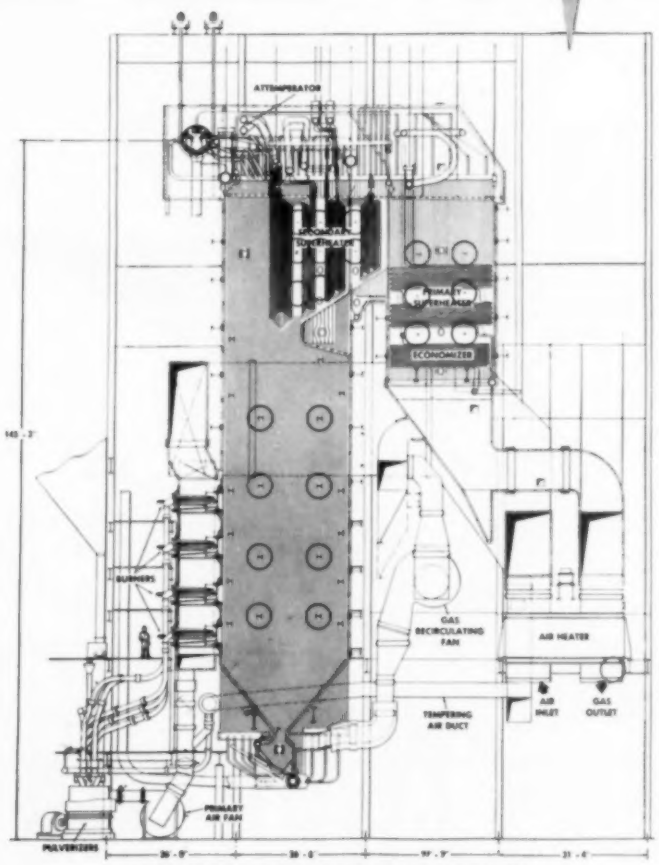
TRADE LESLIE MARK

REGULATORS AND CONTROLLERS

LESLIE CO., 261 GRANT AVENUE, LYNDHURST, NEW JERSEY

CONTROLLED QUALITY MEANS QUALITY CONTROLS

It's Vulcan Selective Sequence for Astoria Station's 2,400,000 lb./hr. Boiler!



CONSOLIDATED EDISON COMPANY
ASTORIA GENERATING STATION, NEW YORK, NEW YORK
BABCOCK & WILCOX TWIN-FURNACE BOILER
2—40'—0" FURNACES

Capacity, Lb. Steam per Hour 2,400,000 — Superheater Outlet Pressure, PSI..2,150
Design Pressure, PSI..... 2,500 — High Pressure Steam Temp., F....1,050
Reheat Steam Temperature, F....1,000

Each of the two forty-foot furnaces firing Consolidated Edison's Boiler 30 at Astoria Generating Station will be equipped with a custom-designed Vulcan Selective-Sequence Soot Blowing System. The boiler now being built by Babcock & Wilcox is a radiant-reheat type to be fired by pulverized coal, oil or gas.

Drive for the soot blower systems will be electric; the blowing medium steam. Both Vulcan long retractable soot blowers and wall deslaggers are included in the system. Vulcan wall deslaggers maintain high striking power, keep thickness of deposits to a minimum.

Whether your boiler is large or small, power or process—a modern Vulcan Soot Blower System with automatic-sequential or selective-sequence control will keep it operating at peak efficiency. Your Copes-Vulcan representative has the ideas, information and experience to help you choose the system best suited to your needs.

NERVE CENTER of the Selective-Sequence system is a completely pre-wired, factory-assembled controller for the soot blowers in each furnace. Selective Sequence lets operating personnel select proper blowing sequence for most effective boiler cleaning. Operator can tell at a glance which blowers are operating, time elapsed, number of blowers that have operated, and any malfunction of equipment or blowing medium.

COPES-VULCAN DIVISION
BLAW-KNOX COMPANY
ERIE 4, PENNSYLVANIA

50th Anniversary BLAW-KNOX 1906-1956

No
PLUNGER ELECTRIC
installation
is too
large

NEW BOOKLET

Booklet A-414 describes the NEW Otis Plunger Electric Freight Elevator designed for low-rise, light and heavy duty freight handling requirements. We'll be glad to send this booklet to you.

BETTER ELEVATORING IS

ELECTRIC • PLUNGER ELECTRIC

freight elevators

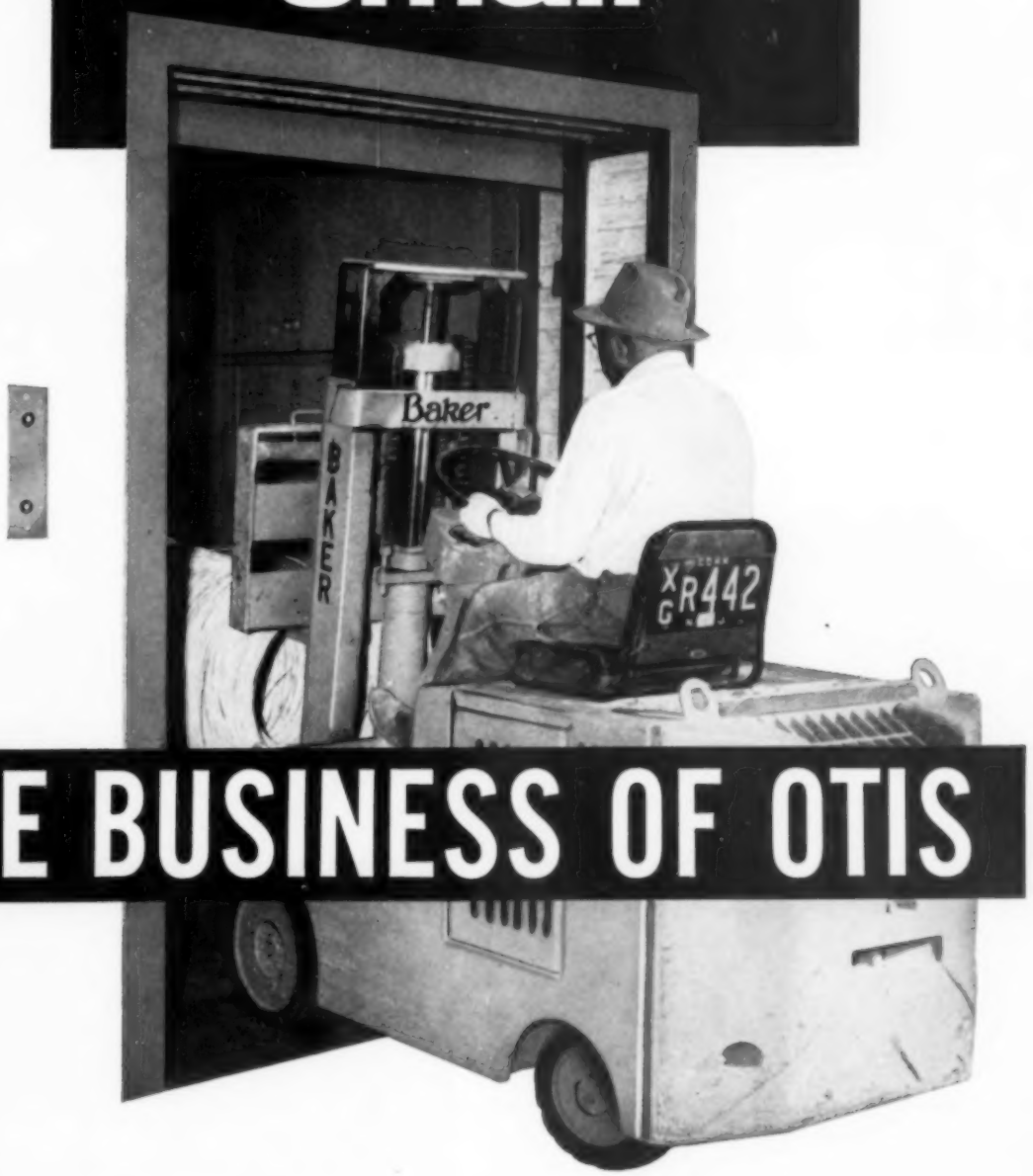
LIGHT, GENERAL, AND HEAVY DUTY

ELECTRIC DUMBWAITERS

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

No
PLUNGER ELECTRIC
installation
is too

small



THE BUSINESS OF OTIS

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

"... we have rallied our forces"

"LIVE BETTER . . . *Electrically* has provided us with a battle cry behind which we have rallied our sales, advertising and promotion forces. With this concentration, we have been able to penetrate deeply into the public consciousness – with noticeable results at all levels of our industry here in San Diego. Our BIG PUSH on LIVE BETTER . . . *Electrically* will continue on an all-out basis."

E. W. MEISE, *Sales Manager*
San Diego Gas & Electric Company

San Diego Gas & Electric Company gets results push on LIVE BETTER...

Immediately after the February 8, 1956, closed-circuit telecast which launched the LIVE BETTER . . . *Electrically* promotion, the San Diego Gas & Electric Company revamped its 1956 residential sales program to include the LIVE BETTER . . . *Electrically* theme in each individual campaign sponsored by the Company, the Bureau of Home Appliances and the Electrical Contractors Division of the Bureau.

This is an example of how one combination utility is making the most of LIVE BETTER . . . *Electrically* to build residential load. Today over 300 utilities throughout the country are actively participating in the powerful, industry-wide program.

BIG OCTOBER PUSH

The LIVE BETTER . . . *Electrically* program plans a concentrated, nationwide drive in October, aimed particularly at dealers and department stores. Major electrical manufacturers are encouraging their distributors and dealers to get ready now to spearhead this major push to retailers in their communities.

At cooking classes, LIVE BETTER . . . *Electrically* is an "umbrella" theme. Here, Home Economist Mrs. Thelma Walters demonstrates better living through the use of electricity.

Dealer displays are set up by utility dealer representatives. Manager of this store says the display tripled small-appliance sales during its 10-day run. Weeks later, sales were still 50% ahead!

. . . . . .

with all-out *Electrically*

LIVE BETTER ELECTRICALLY

On television, Shirley Bradley and C. J. Bunce tell about electrical living. On radio, the theme is used on "Home on the Ranch." Both programs are sponsored by the San Diego Gas & Electric Company.

In newspapers, all San Diego Gas & Electric advertisements feature LIVE BETTER . . . *Electrically*. Here, manager Forrest Raymond checks a few of the advertisements incorporating the theme.

Outdoor posters blazon the LIVE BETTER . . . *Electrically* slogan, stimulating local action with local identification. This utility uses a 100% showing throughout San Diego and county.

At spring fairs and gift shows, the San Diego Gas & Electric Co. uses effective exhibits like this to present LIVE BETTER . . . *Electrically* to the public. Over 60,000 people attended the last show.

Spectacular illuminated displays promote LIVE BETTER . . . *Electrically* at the home offices. Here, Lisle B. Jones, head of Residential Electrical Sales Department, points out one of the displays.

In the PINK of Condition

CHAPMAN MOTOR UNITS

We've done one thing for you. Chapman's Motor Units . . . for operation of valves, floorstands and sluice gates . . . are in the best of condition for accurate performance and longer, lower cost life.

We've made them as you like them . . . simplified them . . . streamlined them . . . taken off all the fat. In fact, when you look at a Chapman Motor Unit today, you can only find approximately *half as many parts* as on any other unit.

This simplicity, combined with Chapman's traditional ruggedness, means less trouble and lower maintenance over a longer period of smooth, accurate performance.

How can you go wrong? With Chapman Motor Units, the simplified design . . . the sturdy construction . . . mean no drift; less slash, accurate micrometer-controlled limit switch for predetermined seat tightness; quiet motor driven operation at all *times*. All at the lowest overall cost.

No trouble with operating positions. Operation is assured at any angle. Rugged stub-tooth gears need no grease or oil. No trouble with operating conditions. All units are weatherproof . . . *steam tight*. No trouble even with installations. When used with floorstands they are completely wired at the factory . . . ready to connect with your leads. Easy and simple to install.

Get our new catalog . . . Catalog 51 . . . on Chapman motor units today.

The Chapman Valve Manufacturing Co.

INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

SOUTHERN POWER AND INDUSTRY

$4,000,000 for Safety

WITH EMPLOYEES already several times safer at work than at home, the Du Pont Company is spending well over $4,000,000 this year, plus a far greater but incalculable cost in effort, in a determined endeavor to have each and every one go a whole year without injury. This is the direct expense; the full cost may run 10 to 15 times as much—or more.

Du Pont's over-all injury rate is exceptionally low; the safety program is intensive and continuous. The company has its sights set on a perfect record. That would mean 100,000 people (including those in government-owned plants) getting along on the job without anybody being hurt—men and women who not only face normal living hazards but also are concerned with the production and compounding of potentially dangerous chemicals in addition to working with the normal tools of production like steam, electricity and heavy machinery.

Must Beat Own Record

So many people have never realized such a goal anywhere, so far as Du Pont officials know. They are trying to get there in two stages: first, a completely injury-free month and, beyond that, the elusive goal of a full year without injury to anybody.

"So long as a single employee is seriously injured at work we cannot be satisfied," Vice-President Robert L. Richards said in a message to employees. "That a goal of 'no injuries' is entirely realistic and can be achieved is borne out by the fact that 70 of the company's plants and laboratories operated throughout the year 1955 without a single disabling injury."

The injury rate the company is worrying about has been dwindling toward the vanishing point but has not yet reached it. The record has brought the company national recognition over the years, including now for the twelfth time the Award of Honor from the National Safety Council—the only company so honored that often.

In 1955, a "second best" year, 77 employees had time-losing injuries on the job. Almost exactly four times as many—307 of them—were hurt in falls alone around home. Altogether, they sustained 1,651 injuries off the job.

In terms of rate, which provides a sound comparison, on-the-job injuries came to .39 per million man-hours worked while injuries away from work added up to 5.36 per million hours of exposure—more than 13 times as much.

The company is also hoping that employees will carry their training in safety off the job with them and is encouraging them to do so. One of the national awards it received last year was for its activity in prevention of home accidents.

Aside from the obvious individual welfare of safety, Du Pont has found its aggressive campaign to prevent personal injuries to be good business although this cannot be calculated financially. The firm believes that the mutual interests between the men and women operating its chemical processes and those in the laboratories and offices and the management lead to confidence and teamwork which is reflected importantly in the success of the enterprise. This tangible interest in the physical well-being of employees does much to strengthen their loyalty to the company.

Personal Responsibility

The way the Du Pont safety program works, every member of supervision from the newest foreman to top management is held personally responsible for the safety of men and women working with him. This makes it an integral part of every job. Ability to get work done without injury is an important consideration for promotion.

Likewise, every employee in the company is also held responsible for the safety of himself and the people around him. The individual is the keystone of the entire program and is expected to do his own job safely. Actually, the company feels that its record is the result of this individual effort by employees.

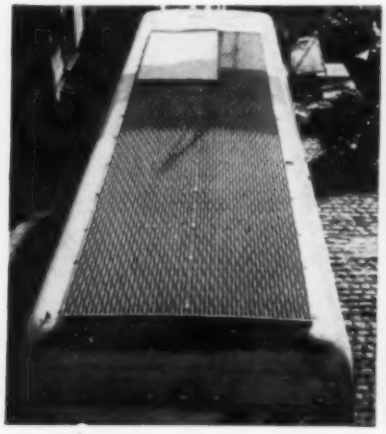
BORDEN *first* IN FLOOR GRATING

NEW USES OF GRATING . . . WHERE ONLY BORDEN QUALITY WOULD DO . . .

Here on this page are a few of the many new uses for grating being pioneered every day. Each is an exacting job where only standards of quality equal to BORDEN'S will do.

And remember . . . BORDEN manufactures every type grating in ferrous and non-ferrous metals.

Light aluminum grating for SUN SHADES on buildings is in perfect harmony with modern design—allows 80% passage of light and air without the accompanying penetrating rays of the sun.



Wherever this Color Television truck goes, whatever the assignment of the reporters who must mount its roof, BORDEN riveted serra-crimp grating will mean surerfooting —even in ice or snow.

Only the finest precision manufacturing would satisfy the architect who designed this door. BORDEN is recognized as a leader in quality, custom-manufactured gratings.

Television relay stations and radar stations that gird our continent have adopted grating as standard outside platform material. It will not collect snow as most other platforms will.

Write for complete
information on BORDEN
All/Weld, Pressure Locked, and Riveted Floor
Gratings in this FREE 8-page catalog

BORDEN METAL PRODUCTS CO.

853 GREEN LANE ELizabeth 2-6410 ELIZABETH, N. J.
SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

BORDEN METAL PRODUCTS CO. W-S

Gentlemen:

Please send me BORDEN Catalog

NAME .....

TITLE .....

COMPANY NAME .....

ST. AND NO. .....

CITY AND STATE .....

INDUSTRY SPEAKS

Air Conditioning for Employee Comfort

Survey conducted by The Trane Company, through a country-wide cross-section of its 90 field sales offices, among leading consulting engineers and architects in the various areas.

A DEFINITE TREND has developed toward air conditioning of U. S. industrial plants for employee comfort as distinguished from air conditioning purely for climatic control for industrial processes.

The trend is particularly noticeable in the South, where some consulting engineers have estimated that as many as 75% of new factories —and 50% of all factories—will be air-conditioned for employee comfort by 1960, and that 90 to 100% of factories will be so equipped by 1970. But the trend is spreading also to the North—particularly in factories involving high skills, such as the electronics industry.

Factors in the trend include competition in industry for skilled help, the desire to maintain employee efficiency in hot weather and pressure from labor unions.

Representative answers from the South and Southwest are as follows, as reported by various offices after checking with leading consulting engineers and architects:

Dallas: 1960—75% of new factory buildings to be air-conditioned for employee comfort, 50% of existing buildings; 1970—90% in both categories; 1980—above 95% in both categories.

Houston: 1960—50 to 75% in both categories; all present facilities not abandoned by 1970 to be air-conditioned.

New Orleans: 1960—50% in both categories; 1970—75% in both; 1980—100% in both.

Atlanta: 1960—40 and 10%; 1970—80 and 50%; 1980—95 and 80%.

Other areas of the country show a much lower potential market for air conditioning in the near future.

Detroit: 1960—7% of new factories, 3% of existing factories to be air-conditioned; 1970—21 and 9%, respectively; 1980—60 and 30%, respectively.

Cleveland: 1960—7 and 4%; 1970—20 and 15%; 1980—35 and 25%; for both new and existing factories making precision and technical equipment: 1960—25%, 1970—40%, 1980—75%.

San Francisco (where low summer and mild winter temperature was listed as a factor): 1960—3 and 6%; 1970—12 and 20%; 1980—25 and 30%.

Chicago: 3 % by 1960, 15% by 1970, 35% by 1980, 90% of those figures in new construction.

One of the industries in which the trend is at its fastest is the textile industry. Consultants in this field estimate that 20% of floor space is air-conditioned with refrigeration today as against one per cent 10 years ago. This is exclusive of spaces using evaporative cooling, and total floor space includes such areas as warehouses as well as production space.

The Trane office at Greensboro, N. C., goes on to report that almost complete air conditioning of textile and tobacco manufacturing areas will be finished by major manufacturers by 1970 and by smaller firms probably by 1980. Very little new construction in either industry will go up by 1960 which is not fully air-conditioned, it is reported.

Although textile and tobacco factory air conditioning often can be justified from a production standpoint (i.e., a maintenance of certain humidities for proper operation of equipment), actual inside conditions are specified which go beyond those requirements, with employee comfort in mind.

Cigarettes for Smoking – Boiler for Steam
Philip Morris Inc., Richmond, Virginia

Quick Steam Peaks Supplied Automatically

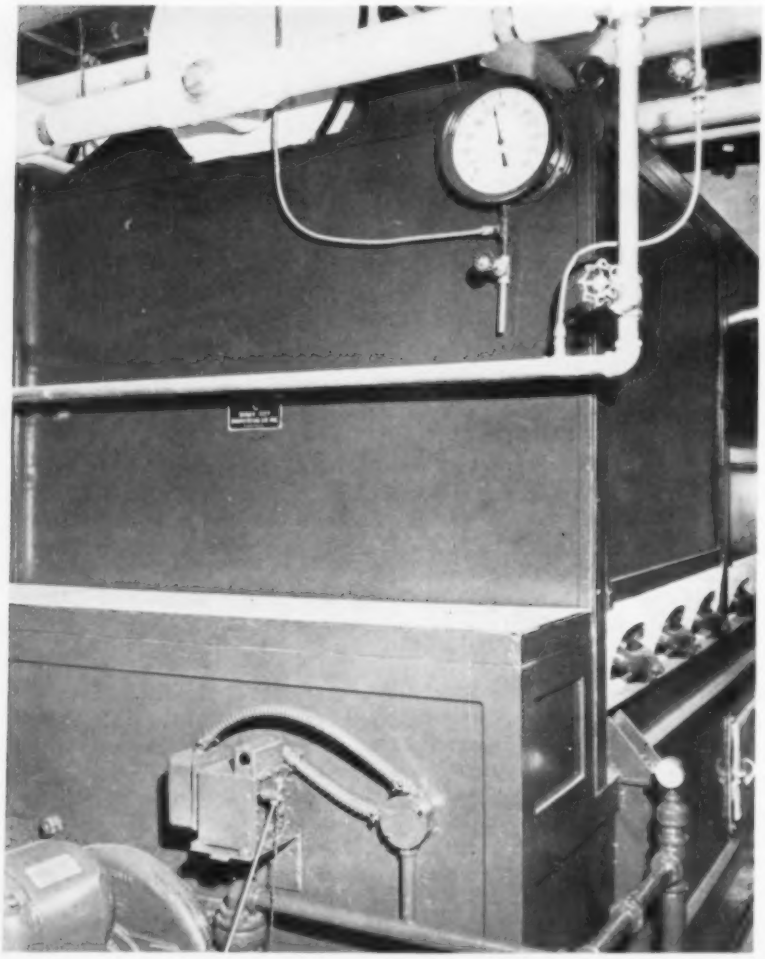
Modern Boiler Operates Unattended

By A. E. ROOP, Mechanical Engineer
Philip Morris Inc., Richmond, Virginia
With FRANCIS C. SMITH, Editor

TOBACCO is all-important in the Philip Morris plant at Richmond, Virginia. While the company spends millions of dollars on fine domestic tobaccos, smaller quantities of "Imported Leaf" are essential in maintaining the exact flavor and aroma on which the buyer acceptance is based.

Steam is essential in the Imported Leaf Department. Here tobaccos from Turkey, Greece and other countries are received, processed and blended before going to the cigarette factories at other locations.

The Imported Leaf Department stands alone as far as plant services are concerned. And recent changes in processing facilities made it necessary to provide a completely new steam generator in a small room of the existing processing building. Requirements are exacting and space for the boiler was limited.

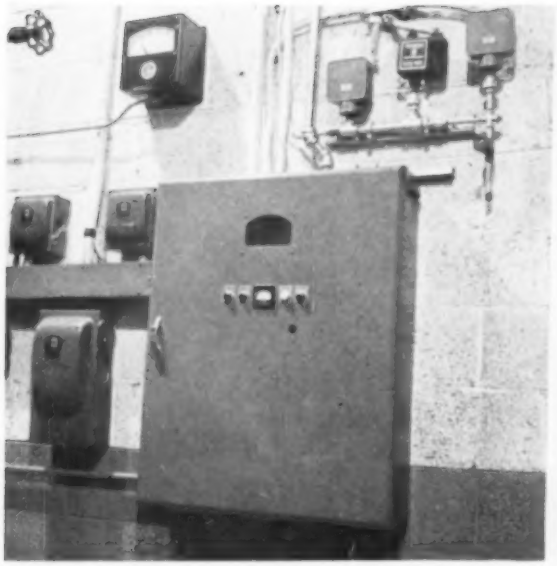


Front of 125 hp Queen City water tube boiler. Limited space in boiler room prevents more comprehensive photograph.

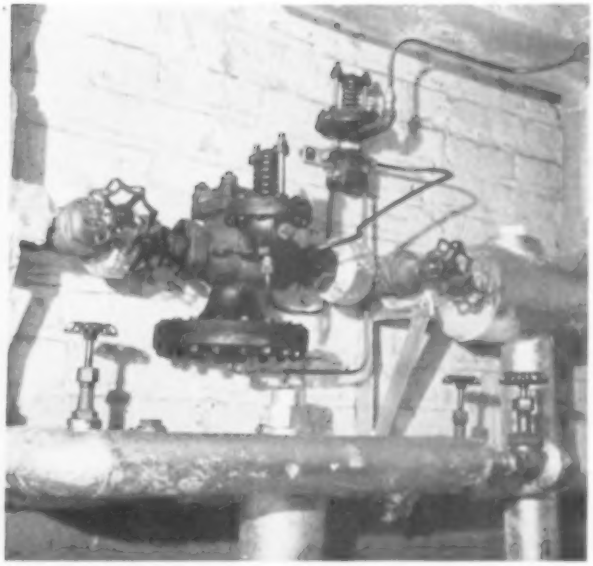
Steam Requirements

Steam is required for only two purposes in this large, independently operated department: space heating and tobacco steaming or humidification. There is nothing unusual about the heating load — somewhat constant in winter and down to zero in summer. But the tobacco is humidified by a "batch process" that calls for quickly meeting full steam demands and then a sharp cut-off. It is this quick peak, quick cut-off requirement that makes automatic operation of the small boiler particularly interesting.

The normal cycle processes three batches per hour, and steam is required for about 14 minutes on each charge. At other times the



Automatic Control Panel



Pressure Reducing Valve Station

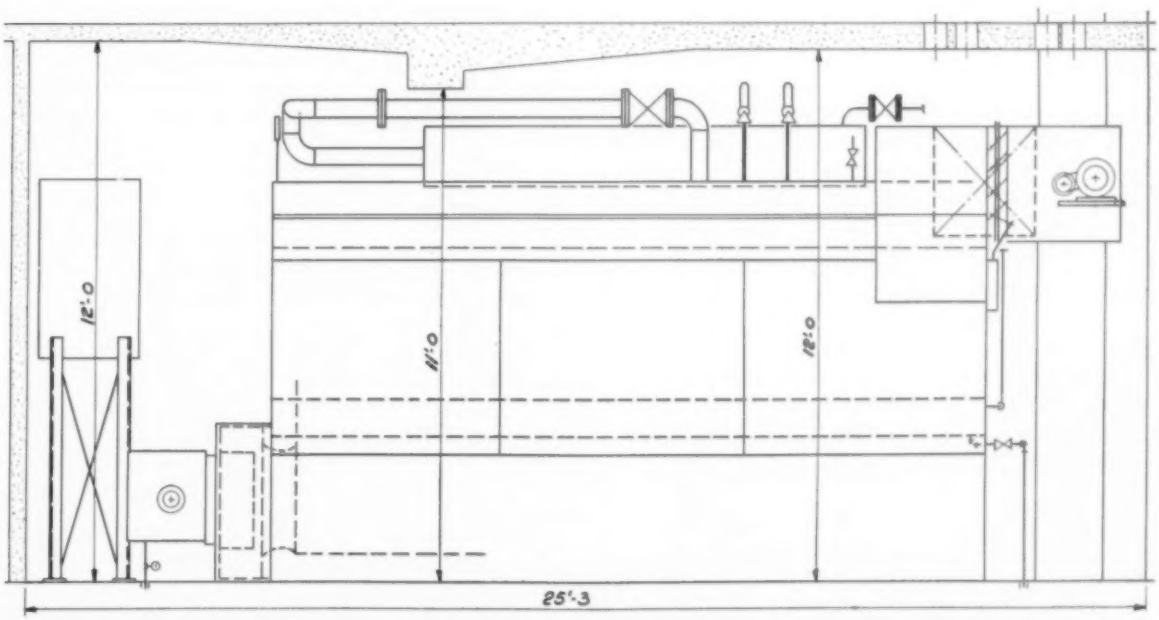
process demand drops to nearly zero, and in summer the heating load is completely off. The boiler must be ready to supply steam at the rate of 5,000 pounds per hour on quick demand and return to no load (with burners extinguished) very rapidly. The normal steam pressure of 125 pounds varies less than 5 pounds on these sudden swings.

Operation

Operation under these severe conditions is entirely satisfactory and need for adjustment of automatic controls is very infrequent. Tests indicate that efficiency is approximately 82% with the boiler operating at 125% rating. The total fuel burned over extended periods indicates good average economy — even with the varying loads.

Boiler and Auxiliaries

The oil-fired boiler is essentially a standard Queen City water tube unit, but it is by no means an "off-the-shelf" design. Modifications were necessary because of space limitations. The boiler had to be built extremely low, and auxili-



Sketch showing how equipment was installed in limited space. Boiler height is lower than standard in order to clear overhead beam and ceiling.

aries were compacted into limited area. Controls were mounted on the building walls. The boiler is about the same length as a standard 150 hp unit, but its height is lower, and it is rated 125 hp.

Auxiliaries are minimum and not special in any way. However, because of the wide load variations and full automatic operation, controls are rather elaborate for a small installation. Ample safety features are provided to handle the on-off oil burner operation. The boiler comes up to full steam after weekend shutdown in 14 minutes. A small shell and tube feedwater heater collects returns from the heating system and helps reduce load shock.

Controls

Only one thing is done to "ease the pain" of sudden demands. A secondary pilot is provided on the heating line reducing valve to cut off this load momentarily if pressure drops more than five pounds when the process peak comes on. This feature alone has contributed appreciably to smooth handling of peaks — and of course momentary interruption of the heating steam has no objectionable effect.

Automatic control of the two feed pumps is arranged on a "backstop" or double safety principle. One pump can supply the boiler — any failure of the "lead" pump automatically starts the reserve unit.

Similar care was exercised in selecting controls for the start-stop procedure. The purging cycle is positive, and electronic flame guards protect against flame-out, pilot failure and insufficient draft.

Design and Erection

The accompanying illustrations and list of principal equipment give a clear idea of how this installation was engineered to meet special needs at minimum cost. Philip Morris engineers were responsible for arrangement of equipment in accord with requirements outlined by F. D. Lillaston, Jr., Department Superintendent. The equipment was purchased on an installed and ready to operate basis through E. McLauchlan & Sons, Inc., Richmond, representative of Queen City Engineering Company of Charlotte, North Carolina. Boiler maintenance is also handled by McLauchlan.

PRINCIPAL EQUIPMENT

BOILER — 1-Queen City Engineering Co. water tube unit, nominal rating 125 hp, maximum continuous steaming capacity 5,800 pounds per hour. Special low design to fit limited head room. E. McLauchlan & Sons, Inc., contractor.

BURNER — 1-Iron Fireman Mfg. Co., RAH-50 oil burner with FP-2 Fire Eye protection. Induced draft supplies secondary air through damper on burner air inlet.

FEEDWATER PUMPS — 2-Fred H. Schaub Eng. Co., turbine type, motor driven. Start-stop operation controlled by Magnetrol from boiler water level.

INDUCED DRAFT FAN — 1-L. J. Wing Mfg. Co., motor driven draft inducer with time delay relay. Manually adjustable to 5 speeds — Max. 1750 rpm.

COMBUSTION CONTROL — 1-Iron Fireman automatic, panel mounted on wall.

BREECHING — 3/16" steel plate with manually adjustable damper. Connected to existing stack.

WATER LEVEL CONTROL — 2-Magnetrol Inc., combination level control and water gages, operate both pumps and the low water cut-off.

DRAFT CONTROL — 1-Cleveland Fuel Equipment Co., Electricarm drive unit with automatic draft control.

STEAM HEADER — 1-16" O.D. header, 10 ft long with ¾" trap accessories.

PRESSURE REDUCING STATION — Spence Engineering Co., 1½" Spence Type E regulator, 2275 pounds per hour, 150 pounds to 8 pounds pressure. With Lonergan 3" safety valve set at 15 pounds. An auxiliary pilot valve is piped to monitor the regulating pilot and cut off steam to the heating system when process steam pressure is low.

Federal Aid to Education

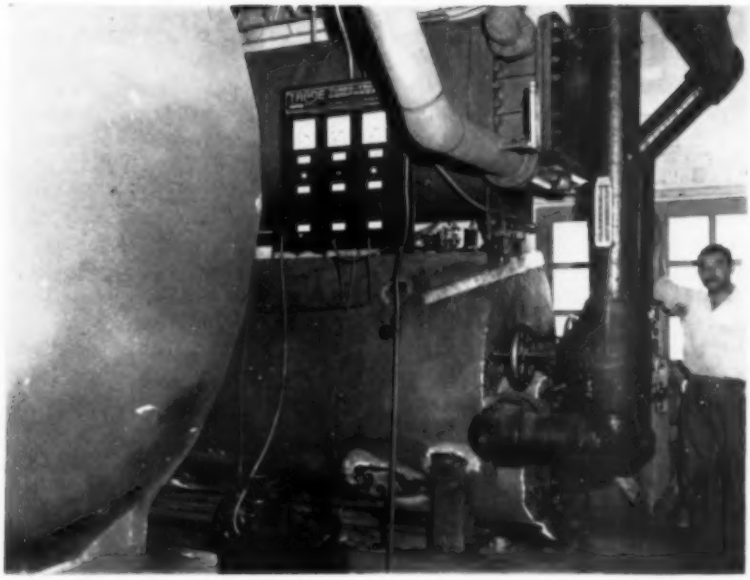
ONE OF THE REASONS why federal aid for school construction seems so attractive is that it looks like something for nothing, according to the Chamber of Commerce of the United States.

But, of course, says the Chamber, this is a fallacy. Actually, you pay twice, and more, for federal aid.

First, every federal tax dollar comes from your pocket, the Chamber points out. Under the present school construction bill (H.R. 7535), you also would pay an equal amount in added state taxes because the bill says that every federal tax dollar must be matched by a state tax dollar. In addition, you would pay the costs of sending your money to Washington and back. And every dollar loses weight in the round trip to Washington.

But there is another cost — even more damaging — the Chamber warns. This is the very probable loss of control over school construction in your community. For the bill provides that a federal administrator would have control over priority of construction projects, standards for planning and building schools and wage and hour standards of labor. What's more, you'll pay the administrator for telling you what to do.

Is this the way American parents want their schools built? Our entire history, says the Chamber, refutes this view.



100-ton Trane shell and fin tube type chiller (lower) and condenser (upper). Chilled water pipes are cork covered; cooling water pipes from tower are covered with 85% magnesia asbestos. Panel board is in center, purge pump at the bottom, and fan housing at the left of above illustration.

By SAM BOYER

Temperature and Humidity Variations Impede Production

Air Conditioner Maintenance

AROUND - THE - CLOCK maintenance of the air conditioning system of a large Southern hosiery mill has become all the more important as new developments in knitting yarns continues. Not only are the sheer nylon yarns, especially the new stretch types, susceptible to temperature and humidity variations, but the long section precision knitting machines are also adversely affected by lack of uniform air conditioning.

The knitting machines, some of which are approximately 54 ft long, contain thousands of intricate, moving parts; all of these parts are fitted to very close tolerances. Temperature variations will cause contraction and expansion of various shafts and parts, thereby throwing the closely gauged mechanism out of adjustment, and will impair the quality of the knitted stockings from one or more sections of the machine.

To stabilize the nylon yarn length during knitting, and to control its elasticity, means that both the temperature and humidity must be very exacting for the following reasons: If the temperature varies slightly, the sheer nylon yarns will contract or expand, and cause lack of uniformity in the standards for finished stocking lengths. If the humidity varies much, the yarns will either drag causing too much tension, or will run loose and also cause inferior quality in the knitted stockings.

Conditions Required

Basic conditions, considered as ideal by most hosiery manufacturers, are control of temperatures at 82 F and maintenance of 50% relative humidity. The chill water type system of air conditioning, such as is in year around operation at the mill discussed, appears to be the most popular type used in hosiery knitting departments. The self-contained, packaged type of air conditioning is generally used in offices and elsewhere in industrial plants, but such systems of conditioning are not within the scope of this article.

The chill water system of conditioning in this plant is designed to deliver sufficient air to cool the conditioned space to an average temperature not exceeding 80 F and an average relative humidity of 50% in weather having a dry bulb temperature not higher than 95 degrees coincident with a wet bulb temperature not higher than 78 F; and to heat the above space to an average temperature not exceeding 80 F with an average relative humidity of 50% in weather having a dry bulb temperature not less than 10 F.

Equipment

This system of air conditioning automatically washes and humidifies the air, and heats or chills it, depending upon atmospheric conditions. It results in high efficiency in knitted production, and also contributes to employee welfare and comfort while on the job. Equipment for the knitting department consists of the following units:

Spray Type Dehumidifier and Pump.

Fan, complete with metal housing.
Air Distribution System.
Turbo-Vacuum Compressor.
Cooling Tower and Pump.
Closed Water Heater.
Reheater Coils.
Relief Dampers.
Fresh and Return Air Dampers.
Temperature and Humidity Recorder.
Complete Pneumatic Control System.

The Dehumidifier (or Humidifier, depending on the season) consists of a set of eliminators, two opposed spray banks with ⅜" x 3/16" nozzles, a set of baffles, and an 18 gauge galvanized enclosure set on a 10 gauge galvanized tank of 1400 gallons capacity. The pump is a Buffalo with a 15 hp motor operating at 1750 rpm and 100 ft head, delivering 400 gpm to the sprays at approximately 35 lb. However, the water does not go directly from the pump to the sprays, but goes first from the pump to a 3-way mixing valve; atmospheric conditions then operate an automatic control which determines whether the water is to be chilled, heated, or by-passed to the spray banks.

Maintenance

Although the 3-way mixing valve operates automatically, a manual by-pass valve must be occasionally adjusted to put the correct amount of water through the chiller during the cooling season. A service note from the maintenance mechanic reads: "Found the Turbo-Vacuum machine running unloaded due to manual by-pass valve in chill water line being open slightly too much. Throttled by-pass valve down to put more water through the chiller, which in turn put a bigger load on refrigeration machine, and in short time brought dew point controller back in control. System now checks all right."

The recirculated water for sprays comes back to the pump suction through a set of screens. These screens should be checked every 8 hours to assure a constant flow of water to the pump suction. The baffles, shown as uprights in the illustration, should be kept clean at all times.

The water in the spray booth tank is changed often enough to insure cleanliness. The make-up control is kept in good working order so as to supply adequate water to compensate for evaporation losses, which amounts to 90 gph during peak load.

All pumps, fans, and motors are checked on a regular schedule for proper cleanliness and lubrication; pump motors are ball-bearing and are lightly greased every three months. The distribution fan has oil-ring bearings with sight oil-gauges; it is checked daily, but requires a slight amount of oil only about once weekly.

Constant Checks

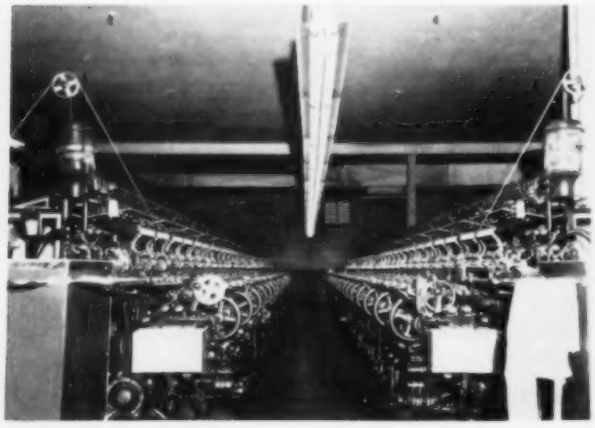
A Brown, 24-hour revolution, two-pen temperature and direct reading humidity recorder is located in the Knitting Department to provide a permanent record of room conditions. This recorder is read hourly, or more often, by supervision; any deviation from desired room conditioning is immediately reported to the maintenance department.

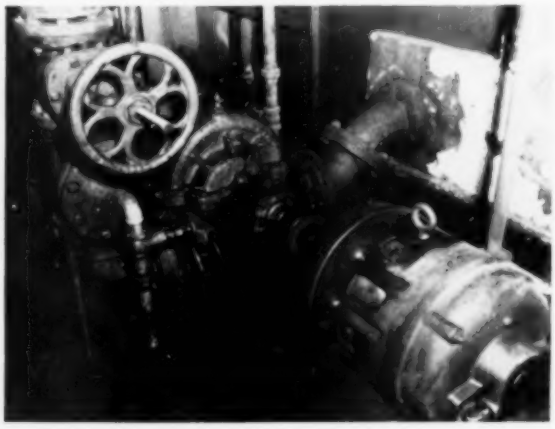
If maintenance discovers either the temperature or humidity off control, the following procedure takes place: The recorder and Hygrostat case is opened on the hinged door, and the air supply gauge is noted; it should read 15 lb, and if less, the system will not operate on control.

Next, the small air supply compressor is checked to determine if it has from 25 to 40 lb pressure on the high side; some of the causes of trouble with the small compressor were, as follows: Overload relay had opened; starting contacts shorted due to excessive lubrication; belt was too loose and slipped; and the ¼ hp motor was

LEFT—Precision knitting machines in operation. One of the three branch ducts for the air distribution system, with the pan type outlet, is shown overhead above machines. A section of the main duct is shown in the background.

RIGHT—This 400 gpm, 100 ft, motor driven pump delivers water to the sprays at 35 pounds pressure. Water leaving the pump passes through a 3-way mixing valve which by automatic control determines whether water is heated, chilled, or by-passed on its way to spray banks.





defective and was replaced with a 1/3 hp motor, which has greatly improved compressor operation.

The reduced pressure is next noted at the reducing valve located at the air compressor, and should be 17 lb at this point. On one occasion the air reduction valve had blown a diaphragm, giving faulty operation until repaired. Another time, the reduced air supply gauge read 17 lb, but all other gauges distantly located on the supply line read from only 3 to 9 lb pressure. In the knitting room the temperature went to 95 F and the humidity went to 70 degrees relative.

The trouble was caused by a rupture in the copper tubing on the supply line in an inaccessible location in back of the dehumidifier. After repairing with connector fittings, the system was back in control in less than 30 minutes. The air supply lines are bled through a catch pot daily to prevent a build-up of moisture in control instruments, which would otherwise cause faulty operation.

Controls

The dew point controller, located near the discharge end of the dehumidifier, controls the dew point temperature desired; the temperature of the air leaving the dehumidifier is known as the dew point temperature, and is the base condition or temperature which determines room conditions. This temperature is indicated by a thermometer located beside the dew point controller.

This control operates the fresh-air and return-air dampers, steam valve to the closed water heater, and also the three-way mixing valve located in the chill water line. The Albreger closed water heater supplies the warm water, through selective positioning of the three-way valve by the dew point controller, that is required by the dehumidifier to maintain the desired dew point during the heating season. The heater is designed to heat 400 gpm at 3 degrees F rise with steam pressure at 5 lb.

When the knitting room temperature is low but the humidity correct, the dew point must be raised, and vice versa. The dew point is regulated from time to time due to changes in heat load and infiltration of dry air in the knitting department. However, when the humidity is erratic, the Hygrostat, which controls the steam valve to the Reheater Coils previously described, is reset by means of a sling psychrometer and chart; this is done before the dew point controller is adjusted.

The dew point, indicated by the thermometer, is normally adjusted to a setting of 64 degrees F; on some occasions the reading may suddenly jump to 70 or even 80 degrees F and indicates trouble in the system. Considerable trouble was caused by the Cooling Tower, which failed to deliver the necessary 300 gpm condenser cooling water to the turbo-vacuum compressor, thereby causing the entire system to become inoperative.

Refrigeration System

A Trane 100-ton turbo-vacuum compressor, with shell and fin type tube cooler condenser and powered by two 50 hp motors, supplies the chilled water required by the dehumidifier sprays to maintain the desired dew point during the cooling season.

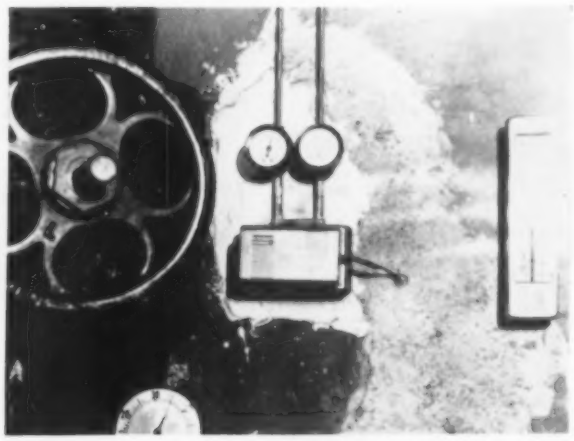
The exact operating condition of the above unit can be determined by thermometers located in the inlet and outlet of chill water, and also by thermometers located in the inlet and outlet sides of cooling water for the condenser, plus the readings from three gauges on the panel board (see first photograph).

The left-hand panel board gauge indicates the pressure in the vacuum chamber of the purge sys-

(*Continued on Page* 108)

LEFT—Recirculated water for sprays is returned to the pump through screens that must be checked to assure adequate flow. Baffles shown here should be kept clean at all times.

RIGHT—Dew Point Controller. Gauge on left indicates supply air pressure, gauge on right indicates controller demand. The thermometer indicates dew point temperature as air leaves dehumidifier. Large hand-wheel controls one bank of sprays, and lower gauge indicates pump pressure to dehumidifier.



These Maintenance Aids Save Time and Money

ELECTRICAL TESTING INSTRUMENTS

By FRANCIS A. WESTBROOK

NUMEROUS electrical instruments are available for maintenance testing. Many, like ordinary voltmeters and ammeters, are found in nearly every plant, but others, which are less well known should be more widely used. The less common instruments may often be very helpful to the maintenance crew and are worthy of notice. They can greatly improve maintenance performance by solving problems faster and speeding trouble shooting procedures.

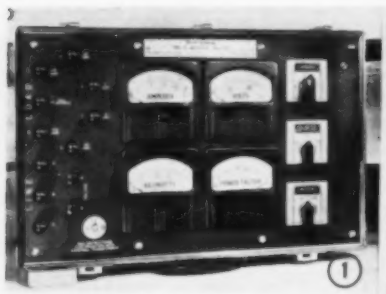
Most of these instruments are portable which is a practical necessity due to the circumstances of their use. It is also true that, due to their diversity of uses, there is available a variety of each, and it is important to have the right instrument to meet the particular requirements of a given set of conditions.

Selection of Instruments

When selecting a portable instrument there are, according to one of the largest makers, three general points which it is well to consider. First consideration is the degree of accuracy required. For checking panel or switchboard instruments the accuracy should be within ½%, for control and communications circuits between 1 and 2% and for equipment such as motors, controls, etc. between ½ and 1%. Normally, price increases with accuracy.

The second consideration is the scale range of the instrument. When used for general testing the best range to select is one where the pointer normally covers from one-fifth to full scale. This is because it is easier to take accurate readings when the pointer covers a considerable arc with plainly distinguishable divisions.

The third consideration is whether to have a portable instrument with one scale or multiple scales. A single scale is the more simple to read and there is also less likelihood of making a mistake. An instrument with a single scale is, furthermore, generally easier to hook up. The practical reason for having instruments with multiple scales is that they make it unnecessary to have several single scale instruments in plants where a variety of tests have to be made calling for different ranges.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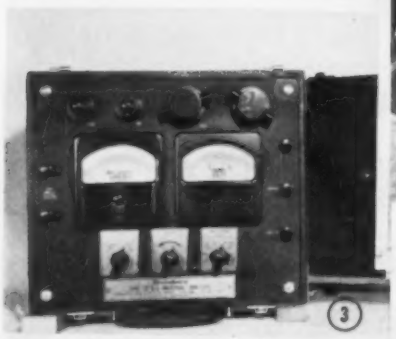
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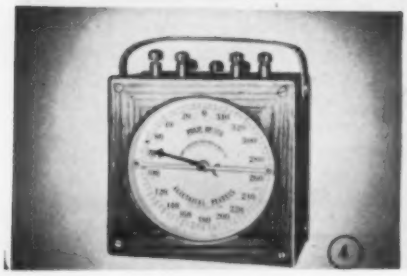
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Industrial Analyzer

One of the most practical portable instruments is the industrial analyzer. This instrument, when designed for alternating current testing, contains an ammeter, voltmeter and polyphase wattmeter, all with triple scales, and a polyphase power-factor meter, as seen in Fig. 1. Switches are provided whereby the current may be read in any of the three phases and to connect the voltmeter across any two lines, both under load so that the balance of each may be checked.

This anaylzer may be used for single, two and three phase motors and other electrical equipment, and by combining all the instruments for checking, testing and installing in a single compact unit weighing only about 35 pounds, a great deal of time and effort is saved. That is, it does away with the selecting and transporting of a multiplicity of testing equipment to the job, setting them up and making the connections. An example of this is seen in Fig. 2 which shows a direct current analyzer in use.

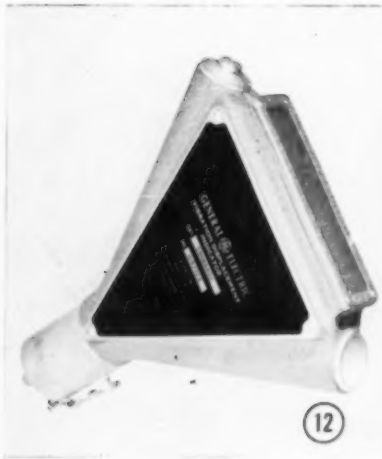
The direct current type analyzer, shown in detail in Fig. 3, contains an ammeter and voltmeter with shunts, multipliers and 1-50 millivolt terminals on the front panel to use with extra shunts when capacities are required higher than those built in the unit. There is also an ohmmeter circuit. This analyzer weighs only 18 pounds and is smaller than the alternating current type.

The load visualizer is a small lightweight analyzer calling for only a few convenient connections with all readings on one dial. It measures amperes and volts directly and watts, vars, volt-amperes, and power-factor indirectly. The normal ranges are O - 2.5/5/25/50 amperes and O-150/300/600 volts which can be extended by split-core and conventional instrument transformers. It is used for load surveys, induction motor testing, reactive power studies and power-factor checks on power and lighting circuits without cutting the conductors or interrupting service.

Circuit Testers

Portable phase meters are used to indicate the phase relation in degrees between a current and voltage and are especially helpful to check relay connections and operations involving directional over-current or differential relays. These instruments may be had for operation at 25 or 60 cycles by changing links on the terminal panel on top, as seen in Fig. 4.

Portable test sets such as the ac - dc, volt - ohm milliammeter shown in Fig. 5 are designed for trouble shooting on signal systems,



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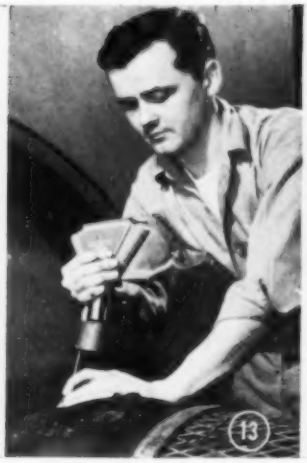

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control systems, etc. where it is necessary to obtain detailed knowledge of circuit conditions. The ohmmeters are for testing the resistance of circuits and the insulation and continuity of assemblies. They are also accurate enough to test condenser leakage limits and for resistor classification. They have ranges for measuring direct and alternating currents and voltages.

Hook-on Types

Volt-ammeters of small convenient size are made to snap around insulated or uninsulated conductors for current readings on any of several ranges according to the setting of a range switch. This is shown in Fig. 6. To measure a-c voltages one end of each of the two test leads are plugged into the instrument and the other ends are clipped to the load. Voltage readings are taken on any of three ranges. When the plugs of the voltage test leads are pulled out of the jacks in the instrument, insulating sleeves automatically snap out to cover the plugs to protect against inadvertent shorts, grounds or shocks.

This type of hook-on instrument of course is very simple to use and very helpful in balancing loads, determining the existence of overloads on motors or circuits, the magnitude of motor starting and running currents, locating grounds, shorts or breaks and checking voltage losses in distribution systems. Obviously a very important point about the hook-on feature is that it is not necessary to interrupt services while taking readings. Another type is shown in Fig. 7.

Wattmeters which hook on more or less similarly (Fig. 8 & 9) are available and are very useful for the quick and easy locating of grounds, making load tests and finding out if motors are operating at rated capacity. Power-factor meters which can be hooked around conductors (Fig. 10 & 11) are suitable for measuring the power-factor on balanced three phase circuits very easily and are particularly useful when making surveys to determine the effectiveness of capacitors installed for power-factor correction.

Phase Indicators

Phase sequence indicators are available in pocket size for the use of maintenance crews and others to show the direction of phase sequence. They are provided with three leads which are connected to the voltage terminals and a lamp that glows to show the sequence. There are no moving parts. Specific applications include pre-determining the direction of polyphase motor rotation, determining proper connections for paralleling generators, transformer banks and power buses and determining proper connections for watt-hour meters, relays and instruments.

Recording Features

A lightweight portable recording instrument which may be had in several voltage ranges has been designed for use outdoors. It is sealed against the entrance of moisture, has temperature compensation and does not use ink, which is liable to freeze or evaporate, for marking the record on the chart. It is particularly useful for making plant surveys, checking regulators, etc. over a period of time.

A recording model is available with split-core transformers for measuring alternating current in feeders and cables without cutting the lines or shutdowns, which is very convenient for checking motor loads and overloads in circuits and other equipment. A general purpose inkless recorder is also available which records polyphase watts, power-factor, frequency and vars. With a watt-var autoswitch it records watts and vars simultaneously.

Ground Detectors

The portable ground detector has been found of great practical value by plant engineers and maintenance men in locating grounds in distribution circuits, motors and other electrical equipment without holding up production. The trouble shooter carries the instrument in his hand and passes it along an electrical conduit, say, and as the fault, or ground, is reached there is a pulsating indication. When the ground has been passed the pulsation ceases. Leakage of current to ground of as little as ½ ampere

(*Continued on Page* 109)

Management-Employee Safety Bulletin for North Carolina Plant

A Planned Accident Prevention Program

By
C. FRED CARLSON, President
and
J. H. BARTHOLOMEW, Production Engineer

Monarch Elevator & Machine Co., Inc.
Greensboro, North Carolina

ACCIDENTS are not decreased by merely talking about safety. Experience has also proved that the company alone cannot prevent accidents. **The company and you can prevent accidents.** The company assumes you want to work in a safe, neat, clean shop.

Be sure to read the last paragraph of this bulletin, but all the others should be read first. Show this to your family too, so if you get hurt, they will know it was your fault.

1—General

We feel a definite responsibility for the safety and well being of all our people. To have a safe place for you to work, we will do our part — BUT — you must do yours too.

Your foreman is held responsible for safety (your safety). Help him, so he can help you. Listen to him and understand his attempt at discipline is for your welfare. He is not a "crack-pot" or a "pansy"; he is trying to do what we tell him he MUST do.

Always be alert to accident hazards and report them to your foreman. Report all accidents to your foreman; our (your) insurance requires this. Foremen are to report immediately all accidents for the purpose of records and establishing date of injury.

Report faulty equipment to your foreman so corrections can be made.

Maintain a calm and steady pace. Don't get excited when the boss is watching; he wants to help.

Running, scuffling, and horse play are not to be indulged in.

Remove burrs and sharp edges from your work so others won't get cut (drilling, stone saw, hack saw, etc.).

Never make a sudden stop or jump where you can't see or feel your way first.

Use tools for their intended use only; don't use files for chisels or pinch bars; they are too brittle.

Get plenty of help to handle heavy material.

2—Housekeeping

Be a good housekeeper always. Do not clutter aisles and walk ways with material, hoses, tools, or any other equipment. Don't

SPIRIT, PURPOSE and INTENT

Accident Prevention at Monarch was intended to be different from most *safety rules* and *bulletins*. The following pointers may clarify the spirit, purpose, and intent of the message:

(1) The text is written in shop language.

(2) It contains a little humor and sarcasm as well as a lot of common sense.

(3) Composed of material suggested in writing by foremen (75%).

(4) It is divided into components or sections based on the work and skills, or both, in use at Monarch.

(5) There is something on housekeeping in most sections.

(6) Each man's name is typed on his copy.

(7) The company president had a personal talk with each foreman before distributing his sheets.

(8) The foremen contributed to the message, and they know that top management conveys the message sincerely.

(9) The written message provides a double-ended needle to use on the foremen and the men.

(10) To keep the message from dying, management will follow up and ask for more suggestions from the men and then develop a small booklet for reissue as conditions and circumstances warrant.

(11) Management also plans to have another meeting of all shop personnel and show a good safety film and talk on safety. Then they will be asked: (a) How many have read the safety message formerly distributed? (b) How many have used it? (c) How many wives have seen it? (d) How many know where their copy is now? (e) Who has what suggestions to add to it?

Interior view of the Monarch Elevator plant at Greensboro, North Carolina. The Company has been in the elevator business twenty-three years and serves an area from Virginia, south to Florida and west to Texas.

This message on accident prevention contains no "rules" or department names and could be used in any plant where similar skills are used. With slight modifications, it may be adapted to any industrial plant.

make them an obstacle course by leaving floats, tanks, oil drums, and other items in the way.

Return empty glass bottles to crates; do not leave them around for others to step on and fall or get cut.

Do not stand long pieces of work or material on end; lay them flat or place them where they can't tip over and injure someone. Work or stock that must be piled must be piled so it won't tip over.

Remove, or have someone else remove dangerous chips on the floor.

Keep tools in their proper place, either where you are working or where they are stored — not on the floor.

Keep oil off the floor where others must walk. Neatness and good housekeeping are the result of good habits (and vice versa). Good habits usually result in a good quality of work (and vice versa).

Empty lunch bags and papers, crumbs, cigar butts, pieces of candy, food, rats, and mice all flock together (on the floor). Dispose of waste instead of living in it.

3—Use of Machinery

Do not try to operate any machine with which you are not familiar until you have been properly instructed by your foreman.

Do not operate any machine while wearing long loose sleeves.

Be careful around any machine while wearing gloves or rings on your fingers.

Clamp work securely or hold in a vise when drilling holes; do not try to hold work in your hands.

Keep safety devices and guards in place while operating any machine.

Do not leave chuck wrenches in the chuck when you have finished a job.

Use goggles on any machining job where chips fly off the work. DON'T WAIT TO BE TOLD.

Poor housekeeping and slovenly work areas are two results of bad habits. Leave every machine neat and clean.

4—Welding

Protect hoses and cords when in use. Do not leave them in aisles, walk on them, or place any work on them. Heavy material crushes them and sharp material will cut them, and you may get hurt.

Place a screen around you and

your work to protect others working near you. Do not forget that materials are hot after cutting or welding.

Be careful of your clothing while cutting or welding. Remember, your clothing will burn too!

Keep gas and oxygen tanks a safe distance from torches or any other source of high temperature.

Keep torch hoses at a safe distance from hot materials.

If welding rods and studs are strewn on the floor, they are dangerous to step on.

5—Eye & Foot Protection

All grinding operations require eye protection; DON'T WAIT TO BE TOLD.

All machining or hand operations that cause chips to fly require eye protection.

Wear a face shield when operating the Iron Worker punching station.

Keep glasses, face shields and goggles clean enough to permit good vision through them.

Never use the stone saw without eye protection.

Wear safety shoes. They have saved us a lot of misery and expense.

Remember, glass eyes are for appearance. They do not improve vision.

6—Hand Tools

Refuse to use electric tools that give you a shock. They are dangerous.

Remove mushroom heads from chisels and other hand tools; do not use them if they are mushroomed.

Grind screw drivers as they are supposed to be ground. Do not use a screw driver in place of a chisel. You may get stabbed doing this.

Do not use center punches or chisels made from files; they are too hard. Don't use a file for a pinch bar; it is too brittle.

Putting tools away where they belong is an important part of good habits. Don't work with pockets full of tools sticking out in all directions.

7—Lifting

Get plenty of help to handle heavy materials.

Do not strain yourself by assuming an awkward position while attempting to lift a heavy load. If you do not know how to lift properly, ask your foreman how it is done.

Use common sense and help others when moving materials.

Wear gloves when lifting sheet metal or other materials having sharp edges.

Carrying heavy loads or moving material is one source of serious accidents if the floor is littered with trash, empty bottles, and tools that should be put away (DON'T WAIT TO BE TOLD).

8—Ladders

Do not leave tools or materials on a ladder.

Do not use a ladder (or anything else) that is unsafe.

Have someone hold a ladder for you if there is any possibility of a fall or injury otherwise.

All straight ladders must be arranged with slip-proof rubber feet.

Don't place ladders in position to use on a floor covered with chips or any other loose trash.

9—Electrical Equipment

Do not work on "live" electrical equipment. Open the service switch before working on any electrical device or machine.

Do not use electric grinders or touch any kind of electrical equipment while standing on a wet floor.

Refuse to use a drill, grinder, machine, or any other device that gives a shock when you touch it.

Cords strewn helter skelter and always in the way constitute a dangerous condition, and they are too expensive to tramp on.

10—Fire

Keep cleaning fluids and other inflammable materials in covered containers.

Beware of cutting or welding near an area in which explosive cleaners are being used. Remember, your clothing will burn too, so be careful.

It is too late to be careful after the fire; be observant and cautious at all times.

Do not place oil soaked rags and waste in combustible containers; use the metal containers provided.

On a number of occasions waste has been found smouldering after everyone had gone home; another hazard resulting from poor habits in housekeeping. This could cost us our jobs too (if the plant burned down). "Waste" is a misleading name. Actually what we call waste costs about 30 cents a pound; too costly to waste.

11—Compressed Air

Do not use air to blow chips if a brush will do the work.

Compressed air can be dangerous. Avoid horseplay. Do not use air to "brush" your clothes.

Air hoses left lying across aisles and thrown around the floor are like bear traps waiting to floor you.

12—Grinding

Use goggles or suitable eye shield on all grinding operations. Don't wait to be told.

When using grinders, be considerate of others around you (bad for the eyes). Use the screens for protection.

13—Pouring Metal

Always use a face shield when pouring babbit or any other molten metal.

Do not pour molten metal without first preheating the work. Any moisture at all will cause "popping."

Ladles should be carried behind you (not ahead of you) to protect your legs and feet if it is spilled.

Prevent Accidents

Insurance company files are full of sad, expensive stories of accidents that could have been prevented had the operator applied a little forethought, and if he had listened to his foreman's attempt at "safety discipline."

If you think you are the exception to the rule in matters of safety, or if you feel it is smart to invite or run the risk of injury, then perhaps you should be making fireworks, TNT, or dynamite, or maybe playing with atom bombs. We want to build safe elevators in a safe plant here at Monarch. That's all we ask! You are part of it, too. As a matter of fact, you are the most important part.

Texas Engineer Tells How to Save Air Conditioning Power

PER CENT PROCESS CONTROL

By JOHN A. WEBER

Match your air conditioning to plant output — and count the savings! Let per cent of process determine per cent of power cost.

Mr. Weber is employed by B. Segall, Consulting Engineer, Austin, Texas. Before going with Mr. Segall, he was a Consulting Engineer at Abilene, and formerly was Chief Engineer, Design and Construction, Board for Texas State Hospitals and Special Schools.

DOES YOUR plant utilize temperature and humidity control for process accuracy and/or comfort? If so, a simple and easily applied control concept may save wear and tear on your plant plus up to 40% of your yearly air conditioning power and fuel bills.

Objectives

Air conditioning is the circulation and treatment of air in such manner that specified conditions of temperature, humidity, cleanliness, and air motion are maintained within the plant. Methods used vary with the accuracy necessary in maintaining the specified conditions.

Available equipment has fortunately kept pace with the demands of efficient production. However, the initial and operating costs of air conditioning rise with the accuracy of control required. Little can be done to reduce the initial cost. The operating cost can be reduced up to 40%, however — the exact amount depending on climate, process loads, and the design of the system.

The added elements necessary for effecting these savings will for convenience be grouped under one heading and referred to as "Per cent Process Control" ("P.P.C." for short).

Three Loads

The size and operating cost of any air conditioning system is basically determined by the sum of three loads. These are the building load, the outside air load, and the plant process load.

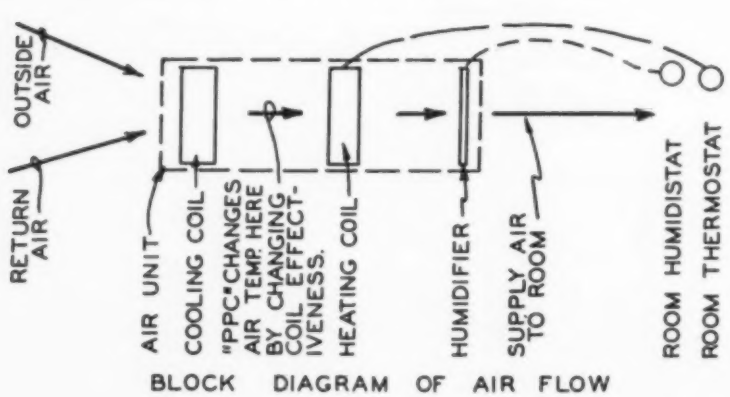
The building load can be reduced chiefly by insulating wall and roof surfaces, by sun-shading exposed glass, and by reducing air drift through building and window "crack" space. These methods are effective with or without "P.P.C."

Outside air is necessary in maintaining plant air free of odor, dust, carbon dioxide, and other contaminants. This air is introduced at the various air handling units and is mixed with return air from the plant. The mixture is then conditioned by the units as necessary. Nobody (as the saying goes) has done anything about the weather; the same holds true of the temperature and moisture content of the outside air entering the units.

The *amount* of outside air necessary, however, varies directly as the "Per cent Process" of the plant; i. e., the more employees in the plant and the more equipment in use the greater the amount of fresh air necessary.

Therefore the first function of the "P.P.C." is to reduce the amount of outside air (and therefore its load on the air unit). This is accomplished by installing modulating motors on the outside air dampers which will respond to the "P.P.C." setting.

The process load varies directly as the number of employees in the plant and the amount of equipment



BLOCK DIAGRAM OF AIR FLOW

For lowest cost steam generation, *General Electric,* Louisville, Ky., burns coal the modern way.

At *American Cyanamid,* Bridgeville, Pennsylvania, power system modernization saves the firm $100,000 a year.

Burning coal the modern way at *Pennsylvania RR's* Juniata shops in Altoona saves $500,000 a year.

Each year more firms

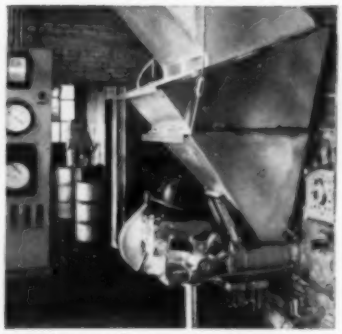
Carbide & Carbon, South Charleston, W. Va., saves $470,000 a year in lower costs and increased efficiency.

Coal costs 40% less than the next cheapest fuel at *Pinehurst, N. C.* resort . . . modernized plant 33% more efficient.

Modernization at *John Strange Paper Co.,* Menasha, Wis., reduced power costs and increased plant production 10%.

are burning coal the modern way

Modernization by *Clark Equipment Co.,* Battle Creek, Mich., supplies power for expanding production facilities, saves $7,500 annually.



Using modern equipment, *Scandinavia Belting Co.,* Charlotte, N. C., has increased steam capacity 150%, cut fuel costs 15% and reduced labor costs 70%.

Modernization gave *Kalamazoo Vegetable Parchment Co.,* Kalamazoo, Michigan, increased steam with lower fuel and operating costs.

Burning coal the modern way resulted in "peak efficiency and economy" for *Garlock Packing Co.,* Palmyra, New York.

for efficiency and economy

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum • Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building • Washington 5, D. C.

in use. The amount of air circulated through the various air units must be maintained reasonably constant to maintain balanced circulation from the various air outlets. The air supplied from these outlets may be damper and warmer (summer conditions) with reduced plant load, however, and still maintain specified plant conditions.

The second function of the "P.P.C." therefore is to bypass a portion of the circulating air around the air unit cooling coil. This reduces the load on the various cooling, heating, and humidifying elements contained in the air unit; and may be accomplished by installing modulating motors on the air unit face and bypass dampers which will respond to the "P.P.C." setting.

The sensitivity, range, and cut-in points of the "P.P.C." may be adjusted individually for the various air units by merely changing the mechanical linkage. The system is therefore adaptable to varying plant conditions and possible future changes in plant process procedure.

The "P.P.C." itself may take any form, but possibly the simplest is a potentiometer (or its pneumatic equivalent) calibrated in per cent of full process load and manually set by the plant foreman in advance of projected process work.

Of course, a time clock or program control could easily be arranged to shift the "P.P.C." to the "zero process" position during weekend, night, or other zero-production hours. The "P.P.C." would then accomplish full savings during off-shift hours, and for convenience might be left on "full process" position during all normal working hours. This would eliminate the necessity for any manual attendance whatever. In such a case, two position damper motors could be used in lieu of modulating type, thus possibly reducing the first cost of "P.P.C."

Outside Air

As described above, air unit load is reduced by controlling the amount of outside air. Such load reduction will be felt almost immediately by the primary sources of cooling and heating, thus reducing fuel and power consumption. The mechanics and control of load reduction at the primary sources will of course vary with system design.

The "P.P.C." has been described above as utilizing face and bypass dampers around the cooling coil for controlling the effectiveness of the air unit in conditioning supply air. Any load reduction here will be felt by the primary fuel and power sources in a manner similar to the outside air load reduction.

Air unit effectiveness can also be controlled, not by bypassing the cooling coil, but by controlling the circulating media in the cooling and heating coils in response to the "P.P.C." setting. A combination of bypass control and circulating media control might also be used. The mechanics of this type control will of course vary with system design, but the load reduction on primary fuel and power sources can still be accomplished in most cases.

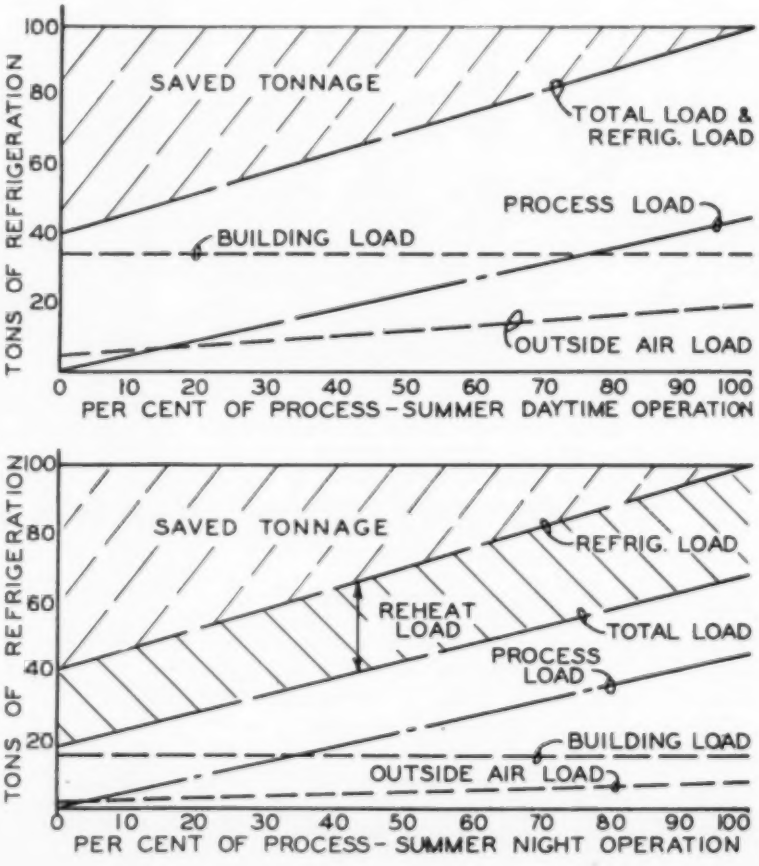
Savings Made

Many plants have attempted to reduce operating costs by merely turning off the air conditioning during off-shift hours. This usually fails, primarily because of the time lag which occurs in bringing the buildings and the materials to desired conditions at the start of the working day.

Turning on the air conditioning several hours in advance does not solve the operating cost problem, since the added time of operation at "full process" condition plus the product "pulldown" load will usually more than equal the "P.P.C." operating cost. This is especially true if night temperatures and moisture contents never drop below specified plant conditions during the summer months.

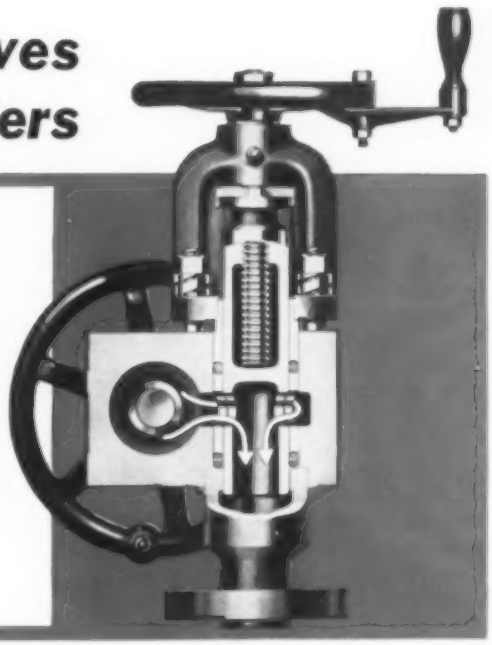
Consider a plant working one

These graphs illustrate the points explained in examples 1 and 2.



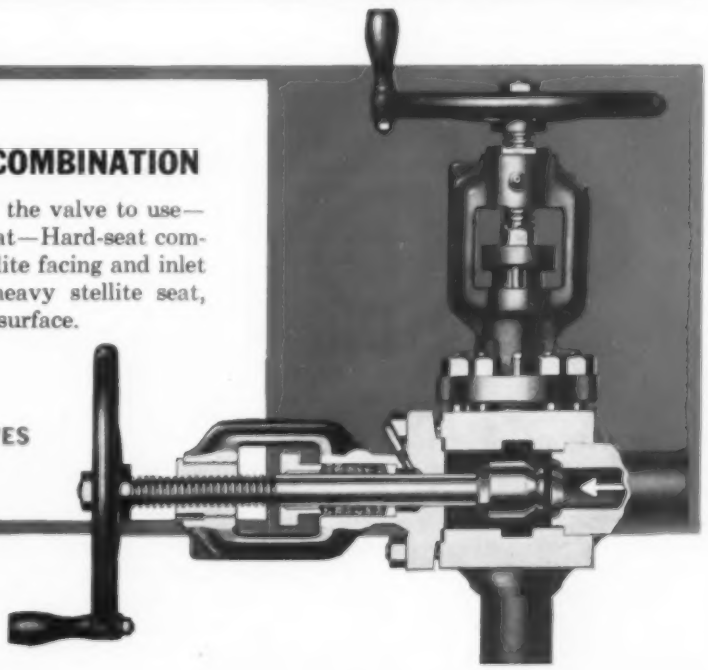
UNIT TANDEM

rugged blow-off valves for high pressure boilers



HARD-SEAT—SEATLESS COMBINATION

■ For boilers up to 1500 psi, this Yarway Unit Tandem Blow-Off Valve offers the maximum in dependable service. A one-piece forged steel block serves as the common body for the Yarway Stellite Hard-seat blowing valve and the Yarway Seatless sealing valve. All interconnecting flanges, bolts and gaskets are eliminated. The Unit Tandem at right is sectioned through Seatless Valve to show balanced sliding plunger in open position and free flow.



HARD-SEAT—HARD-SEAT COMBINATION

■ For boilers to 2500 psi, this is the valve to use—Yarway's Unit Tandem Hard-seat—Hard-seat combination. Disc has welded-in stellite facing and inlet nozzle has integral welded-in heavy stellite seat, providing smooth, hard-wearing surface.

OVER 4 OUT OF 5
HIGH PRESSURE PLANTS
USE YARWAY BLOW-OFF VALVES

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YARWAY BLOW-OFF VALVES

eight hour shift per day five days per week with maximum process and outside air load equal to the peak daytime building load. Under these conditions the "P.P.C." system will save approximately ½ times 128/168 or 38% of the refrigeration compressor kilowatt-hours. Different conditions will of course produce different savings.

Examples

(1) As an example, refer to the "Summer Daytime" graph based on a typical 100 ton plant. The outside air was allowed to vary from 20% at full process condition to 5% at zero process; the outside air load varied from 20 tons to 5 tons accordingly. The process load (including equipment lighting, motors, employees, and misc. heat sources) varied from 45 tons at full process to zero tons at zero process.

The building load was constant at 35 tons regardless of "Per cent Process." Building load includes all sources of heat gain not associated with the process. The total load (sum of above loads) then varies from 100 tons at 100% process down to 40 tons at zero process. The refrigeration plant load during peak conditions equals the above total load and savings of zero to 60 tons are possible.

(2) A "Summer Night" graph is included for comparison. Note that the average overnight building load (varying from a high before sundown to a low before sunup) is only 15 tons; note also that the outside air load is reduced due to lower night air temperatures.

The process load does not vary with time of day, but the total load is less than for daytime operation. However, the refrigeration load is greater than the total load; in fact is equal to the daytime refrigeration load. This is due to the fact that the "Per cent Process Control" does not reduce load for daily temperature swing, since the daily swing is not accurately enough predictable (especially considering the heat transfer lag through building construction.

The difference at any instant between total load and process load is made up by reheating the air in the reheat coil in response to the thermostat; the amount of reheat will vary with the time of day and should be zero on a hot afternoon.

Conclusions

It can be stated as fundamental that it is practically impossible to control latent heat (moisture) independently of sensible heat in a wide range temperature and humidity control system. There will always be some cross-action between the functions of the thermostat and humidistat.

Due to this action, as well as the variable nature of outdoor air conditions and process requirements, the usual system must be designed to simultaneously remove more moisture and more sensible heat than is ever quite necessary during the worst load conditions. Moisture and sensible heat are then added back to the supply air in such quantities as needed to maintain specified plant conditions. (Reset controls, although used, seldom in themselves produce the desired accuracy of result over the full load range due to the aforementioned interdependence of temperature and humidity in the cooling coil.)

"P.P.C." then, simply stated, merely reduces the outside air load and the cooling coil effectiveness in proportion to projected plant demand. In so doing, it also reduces the amount of reheat and rehumidification needed to automatically maintain plant conditions. And, best of all, it does so with standard, easily applied control elements (some of which may already be installed in the existing plant air units or specified for any new plant air units).

DRILLING — Techniques . . . Speeds

ALTHOUGH twist drills can withstand amazing abuse, wear and breakage are reduced by using the right one for each job, according to Rockwell-Delta power tool engineers.

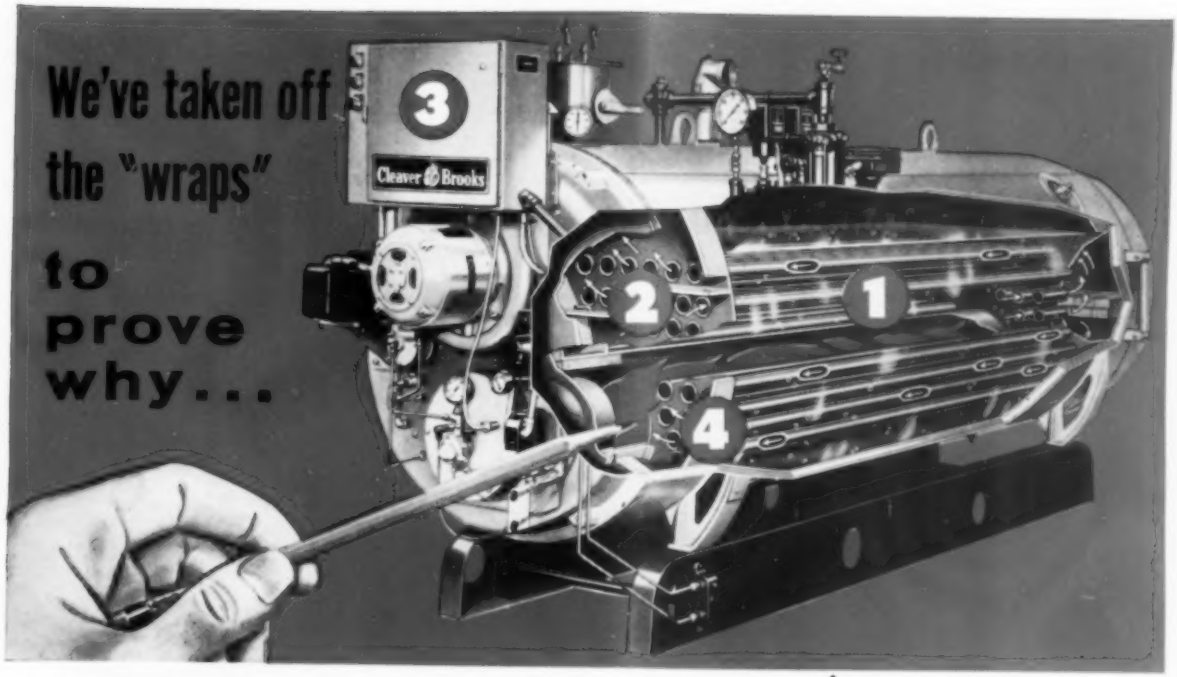
The standard, 118-degree point angle is adequate for most work, but faster and better production usually results when one of five common variations is used for a given job. The average person can easily grind drills to match requirements of specific metals and plastics if he knows the fundamentals of a good cutting edge.

Variations in the point angle and lip clearance angle have different effects when working different materials. In general, blunt points are used on harder metals—where there is danger of tearing—and on very thin sheets. Sharper angles are more efficient when drilling plastics or soft metals.

Specifications for various special purpose twist drills are illustrated.

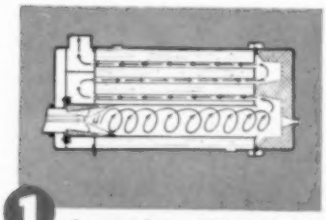
Grinding off the cutting edge of each lip gives a drill with zero rake. This makes the edge scrape rather than cut, and reduces the tendency of the drill to dig into brass and other soft metals and most plastics. It's not good with plastics with low melting points, however, because heat will cause chips to gum and stick to the drill. Zero rake also produces a stronger cutting edge, making it suitable for drilling very hard steel.

Drills, like all cutting tools, require clearance behind cutting

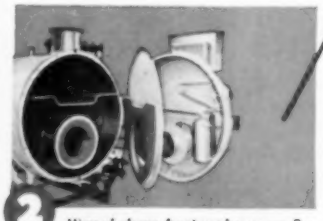


CB is America's most modern boiler

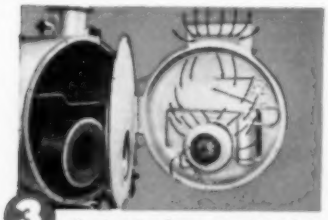
unmatched in performance quiet operation low-maintenance



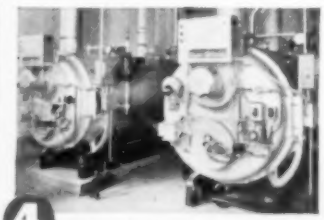
1 **Four-pass design with forced draft** — Proved the most efficient combination to transmit greatest percentage of heat to boiler water. Blower provides cool, clean air in required density and volume for efficient fuel combustion — lowers fuel costs.



2 **Hinged doors front and rear** — Expose tubes for quick inspection or cleaning. Operating equipment and refractory stays intact. Cuts routine maintenance from hours to minutes. Doors are gasketed with preformed asbestos to be seal-tight.



3 **Caseless fan keeps operation "hospital quiet"** — Air is drawn into a large plenum chamber which confines and deadens air noises. Even at peak loads, CB is well within requirements for low sound levels where this is a factor.



4 **Automatic controls are centralized for convenience, efficiency and safety** — Air is metered with oil (or gas) in proper ratios to economize on fuel. Electronic flame failure control is standard equipment.

CB boiler's remarkable performance in hundreds of applications has proved an "eye-opener" wherever installed. Take a minute's time and see why.

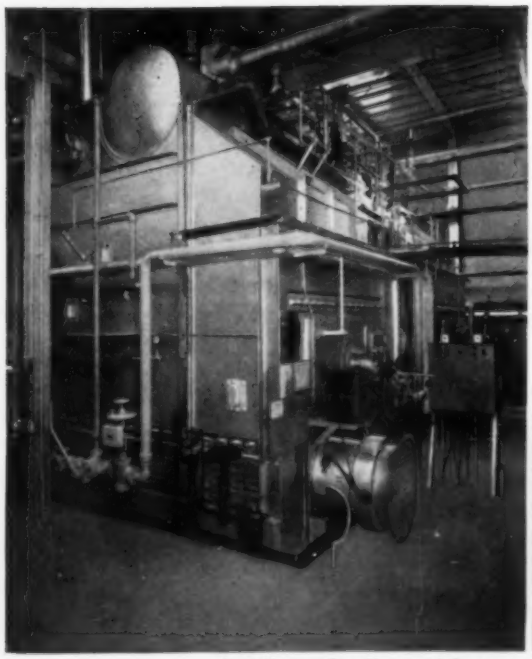
Combined into one boiler package are all the features *proved necessary* to: (1) save fuel dollars, (2) simplify maintenance, (3) assure silent performance, (4) maintain safe, automatic operation.

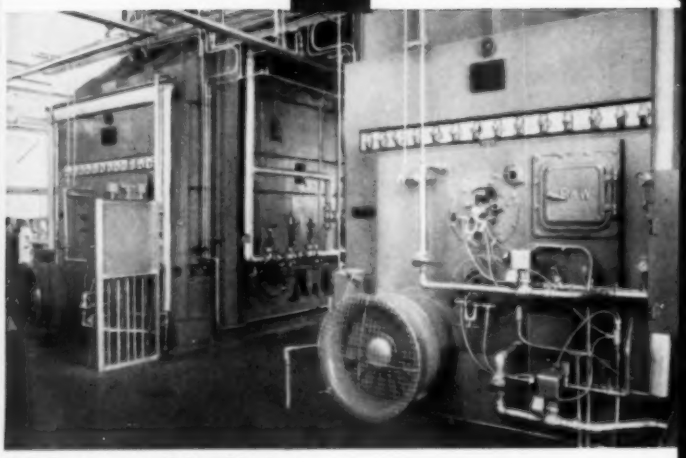
Talk to your nearby Cleaver-Brooks boiler representative — he can assist you in selecting the proper unit from a complete line of sizes, steam or hot water, 15 to 250 psi. Or, write direct for literature. Cleaver-Brooks Company, Dept. K, 305 E. Keefe Ave., Milwaukee 12, Wis., U.S.A. Cable Address: CEEBEEWEST — all codes.

BOILERS—STEAM OR HOT WATER—FOR HEATING OR PROCESSING, IN SIZES 15 TO 600 HP, 15 TO 250 PSI.

Cleaver Brooks

TWENTY-FIVE YEARS OF LEADERSHIP
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER



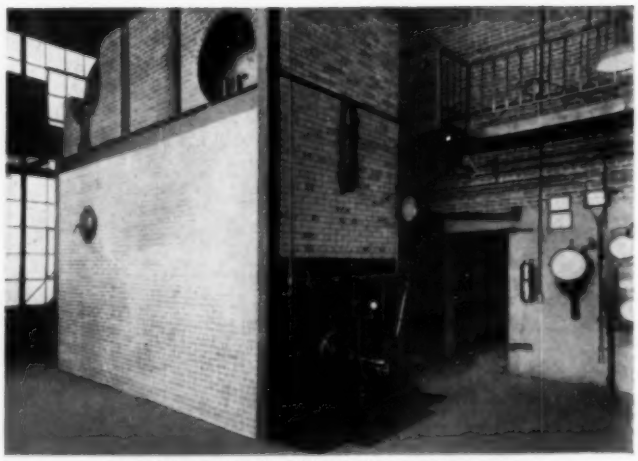


Both Kansas City Plant and Gastonia, N. C. Plant, newest of the H&D plants, have two 18,000 lb per hr boilers. The Kansas City boilers use either gas or oil depending on availability. The Gastonia boilers use oil only. All these boilers have forced-draft fans mounted directly on the burner windbox.

B&W BOILERS:

A 35-YEAR ACCEPTANCE STORY AT HINDE & DAUCH H&D

Hinde & Dauch operates corrugated box factories in major markets of the East, Midwest, and South



This oil-fired 150 HP B&W Boiler went into service in 1930, at H&D's Baltimore box factory.

The Hinde & Dauch Paper Company is one of the country's largest manufacturers of corrugated paper materials. Its remarkable growth since 1882, from a single threshing machine and straw baler, has been paced by ingenuity in adapting the product to varying conditions—virtually making markets where none previously existed.

As a leading corrugated box manufacturer, H&D requires an efficient, dependable steam source in each of its many plants scattered around the country. And since 1921, when three 516 HP B&W Boilers went into service in the company's Fort Madison, Iowa plant, The Hinde & Dauch Co., has been using B&W Boilers of various types and capacities in its plants from Watertown, Massachusetts to Kansas City, Kansas—the strongest possible indication of acceptance based on performance.

Since 1946, B&W Boilers for H&D have been of the Integral-Furnace Type. In its newest plant at Kansas City, Kansas, two B&W Integral-Furnace Boilers went into service in November of 1955. Each unit provides 18,000 lbs of steam per hr and is equipped for oil and gas firing. Some of the other H&D installations have provision for future stoker firing, to afford full benefit from fuel price fluctuations. Today there are 19 B&W Boilers in service at H&D plants, for a total of 275,000 lb of steam per hr.

For the past 35 years, Hinde & Dauch has been relying on B&W Boilers for dependable, economical steam. Like many more industrial concerns in various categories, this company has found B&W Integral-Furnace Boilers ideally suited to its steam requirements, both processing and heating. Take a tip from this long association if you are considering steam plant modernization or expansion. B&W Integral-Furnace Boilers are available in individual capacities to meet any requirements from 2900 to 350,000 lb of steam per hr.

Write for complete details to The Babcock & Wilcox Company, Boiler Division, 161 East 42nd St., New York 17, N.Y.

B&W INTEGRAL-FURNACE BOILERS
OFFER THESE 10 COST-SAVING ADVANTAGES

- Minimum floor space and headroom requirements
- High fuel economy
- Smokeless combustion
- Adaptable to all fuels and firing methods
- Economical fast steaming
- Water-cooled furnace
- Clean, dry steam at all ratings, even with high boiler water concentration
- Quick response to wide and heavy load swing demands
- Easy to inspect and clean
- High availability with least attention

BABCOCK & WILCOX
BOILER DIVISION

G-777

edges to permit chip removal. Variation in the clearance angle changes the size and shape of the chip.

Checking Required Arc

Lip clearance angle is ground by starting with cutting lips against the wheel and then dropping the other end through an arc equal to the lip clearance angle end as the drill is rotated through one-sixth of a full turn. Easiest way to determine how much to lower the drill is to swing a new standard drill against the stationary wheel, noting how much movement is required to keep the ground surface in contact. This will indicate the arc required for a standard, 12-degree clearance angle. Other angles can be obtained by proportionate variation of the movement.

The curved face of the web should be thinned after the point is ground in order to reduce the thrust needed to force the drill through the work. The web can be thinned easily by grinding with a flat-edge or round-edge wheel.

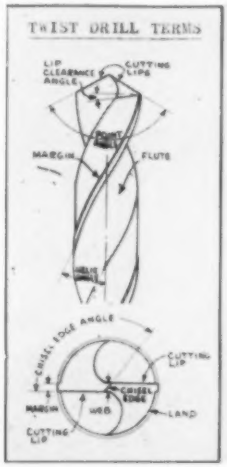
There are also attachments for bench grinders that permit perfect mechanical grinding of drill points of any standard angle. Where points are ground by hand, care should be taken not to burn the drill point.

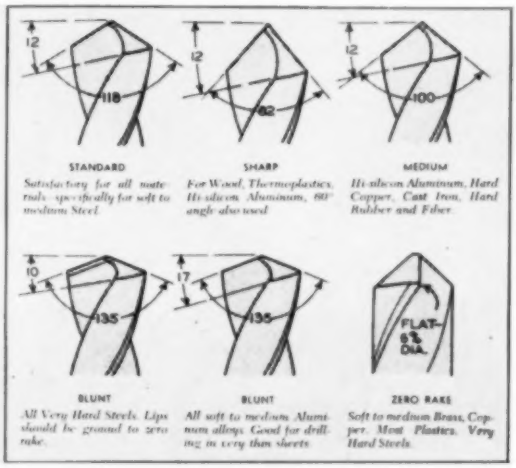
Most important factor in long drill life, emphasize the Delta engineers, is proper drill press speed. Most well designed drill presses have a sufficient range of speeds for all but extremely specialized drilling.

The chart shows speeds recommended by Delta for metals of varying hardness and drills from 1/16-in. through ¾-in.

Special drills improve accuracy and speed of drilling. They can be made by changing the point angle and lip clearance angle of standard drills. Grinding must be done carefully, but can be done on a regular bench grinder.

Drill press speed is also important in drilling various materials. The accompanying chart shows speed recommended by Delta Power Tool engineers.





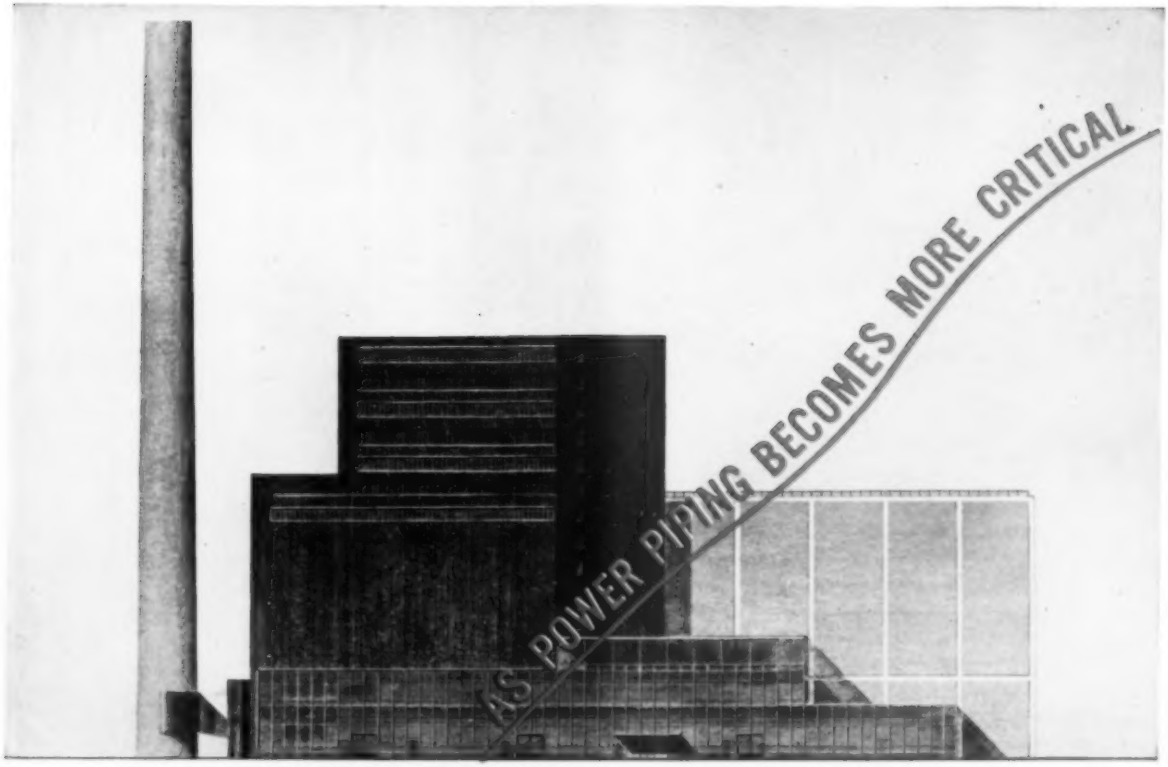
DRILL SPEEDS IN R.P.M.

¼" High Speed 680,1250,2400,4600,R.P.M.

¼" Slow Speed 470,780,1300,1950,R.P.M.

Diameter of Drill	Soft Metals 300 F.P.M.	Plastics and Hard Rubber 200 F.P.M.	Annealed Cast Iron 140 F.P.M.	Mild Steel 100 F.P.M.	Malleable Iron 90 F.P.M.	Hard Cast Iron 80 F.P.M.	Tool or Hard Steel 60 F.P.M.	Alloy Steel Cast Steel 40 F.P.M
1/16 (No.53 to 80)	18320	12217	8554	6111	5500	4889	3667	2445
3/32 (No.42 to 52)	12212	8142	5702	4071	3666	3258	2442	1649
1/8 (No.31 to 41)	9160	6112	4278	3056	2750	2445	1833	1222
5/32 (No.23 to 30)	7328	4888	3420	2444	2198	1954	1465	977
3/16 (No.13 to 22)	6106	4075	2852	2037	1833	1630	1222	815
7/32 (No. 1 to 12)	5234	3490	2444	1745	1575	1396	1047	698
1/4 (A to E)	4575	3055	2139	1527	1375	1222	917	611
9/32 (G to K)	4071	2712	1900	1356	1222	1084	814	542
5/16 (L, M, N)	3660	2445	1711	1222	1100	978	733	489
11/32 (O to R)	3330	2220	1554	1110	1000	888	666	444
3/8 (S, T, U)	3050	2037	1426	1018	917	815	611	407
13/32 (V to Z)	2818	1878	1316	939	846	752	563	376
7/16	2614	1746	1222	873	786	698	524	349
15/32	2442	1628	1140	814	732	652	488	326
1/2	2287	1528	1070	764	688	611	458	306
9/16	2035	1357	950	678	611	543	407	271
5/8	1830	1222	856	611	550	489	367	244
11/16	1665	1110	777	555	500	444	333	222
3/4	1525	1018	713	509	458	407	306	204

Figures are for High-Speed Drills. The speed of Carbon Drills should be reduced one half. Use drill speed nearest to figure given.



Architect's sketch of Philadelphia Electric Company's new Eddystone station

Kellogg's High Alloy Fabrication Keeps Pace

Designed to operate at 5000 psi at turbine throttle valve, and 1200 F., Unit No. 1 at Philadelphia Electric Company's new Eddystone station presented critical problems in the selection of an alloy for supercritical pressure piping, and in techniques for fabricating heavy-walled sections of this alloy in the shop and in the field.

More than a year ago, The M. W. Kellogg Company presented a comprehensive program to the Philadelphia Electric Company for selecting a suitable alloy, and since then has been working closely with this public utility and other prime contractors toward completion of the project. Numerous materials were studied, welded, tested, heat treated, and evaluated at Kellogg's Jersey City metallurgical laboratories. After many months of extensive and intensive work, Type 316 Stainless was selected. M. W. Kellogg has already perfected welding techniques, and is now continuing tests on this alloy and several other compositions, including strain aging for 1000 hours and 10,000 hours at 1300 F., to accumulate other data.

While this is the first time that Type 316 will have been used in power plant service for temperatures as high as 1200 F., and pressures as much as 5000 psi, it is by no means Kellogg's first experience with Type 316 or other stainless steels. For example, M. W. Kellogg recently undertook metallurgical studies and research for another large public utility prior to its selection of Type 316 for use at 1100 F. and 2400 psi. Kellogg also has done considerable fabrication of main steam lines and turbine leads, using Type 347.

The M. W. Kellogg Company welcomes the opportunity of discussing future power piping requirements with consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.

FABRICATED PRODUCTS DIVISION
THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17, N. Y.
A SUBSIDIARY OF PULLMAN INCORPORATED
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POWER PIPING—THE VITAL LINK

Gulf States Utilities Company Engineer Reports Two-Years Experience

Operating Two-Bed Deionization Plant

By W. B. GURNEY
Superintendent of Results
Gulf States Utilities Company
Beaumont, Texas

Gulf States Utilities Company's deionization plant was described in companion papers by W. B. Gurney and C. R. Stewart, published in Proceedings of American Power Conference, Volume XVI. Those papers were abstracted in Southern Power and Industry for November, 1954 — p. 58. Information in this article is from Mr. Gurney's paper presented at the American Power Conference sponsored by Illinois Institute of Technology, March 21-23, 1956.

OUR 3,500 gpm Deionized Water Plant* at Baton Rouge, Louisiana, delivers 100% make-up deionized water to 3—560,000#/Hr. 1,500 psi boilers whose steam is passed through two 60,000 kw non-condensing 135 psi exhaust turbines.

This plant has been in service for over two years, operating continuously at over full base load with no loss of capacity. The deionized water plant economy and performance has been maintained and the improvement anticipated with the operation of the anion resin has been realized.

Miscellaneous Difficulties

Very little difficulty was encountered with the automatic control system except for several items. Sand from the wells lodged in the meter orifice of the sulphuric acid dilution water meter. The rubber was charred in the delivery line but not on the cation unit shell. Leaking soon resulted and the entire line had to be renewed and protective equipment installed.

TABLE I

CONDITIONING OF 11 FT DIA. ANION UNIT RESIN

Minutes (1)	Minutes (2)		Rate pphr	F	Cond. MMHOS
0	0	Start Backwash	260,000		0
19	19	End Backwash			
4	23	End of settling: start of injection of previously reclaimed caustic	65,000 to 55,000		0
37	60	Start of 5% caustic (Water 33,000 ppm, NaOH 13.4 gpm of 25% NaOH)	39,000	90	120,000
36	96	Start of 7.25% NaOH (Water 33,000 ppm, NaOH 22 gpm)	44,000	125	203,000
38	134	End of 7.25% NaOH and start of slow rinse through caustic lines	33,000	125	260,000
20	154	End of slow rinse		125	300,000
2	156	Start of reclaiming caustic	55,000		
39	195	End of reclaiming caustic		100	120,000
2	197	*Started 2 minute backwash with anion effluent	130,000		
2	199	Backwash valve closed			
3	202	Started fast rinse	200,000		110,000
30	232	Start of recycle	210,000		300
30	262	Ready for service			3

Total, 4 Hrs, 22 Min.

*Short backwash to relevel bed after its expansion.
(1) Between operations.
(2) Accumulated.

Changes in the anion regeneration system have been made. The time and different functions are shown in Table I.

Considerable hydrogen sulfide was released by the water cooling the tertiary jet steam on the barometric vacuum degasifier. The water condenser was removed and the jet allowed to discharge upwards into the atmosphere at the top of the vacuum deaerator. This saved water and got rid of the obnoxious odors.

At full load on the vacuum degasifiers and with the secondary and tertiary jets in service, the back pressure was 1.51 inches of mercury. The degasifier effluent contained 1 - 2 ppm CO_2 and 0.04 ppm H_2S. With all three jets in service the back pressure was 1.32 inches mercury. The CO_2 and H_2S was nil. O_2 was reduced to 0.01 ppm. Water temperature is constant at 90 F.

Anion Resin Experiences

Anion units 2, 4, 6, 8 have retained and even increased their initial kilograin exchange capacity of 20 Kgr per cu ft.

Anion units 1, 3, 5, 7 have shown very erratic performance. Their capacity varied from 8 Kgr per cu ft to 18 Kgr per cu ft. In efforts to determine the cause of this variation in capacity we have investigated loss of resin exchange capacity and basicity, organic fouling of the resin, mounding of the bed during the regeneration cycle, hydrogen sulfide and/or iron sulfide fouling of the resin, swelling of the resin bed, sudden changes

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why the Riley TURBO

. . . why it eliminates flyash disposal
. . . why practically any available fuel
. . . why higher operating economies

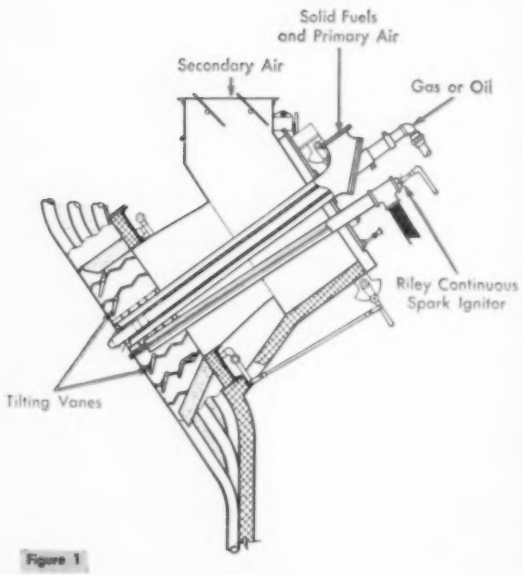

Figure 1

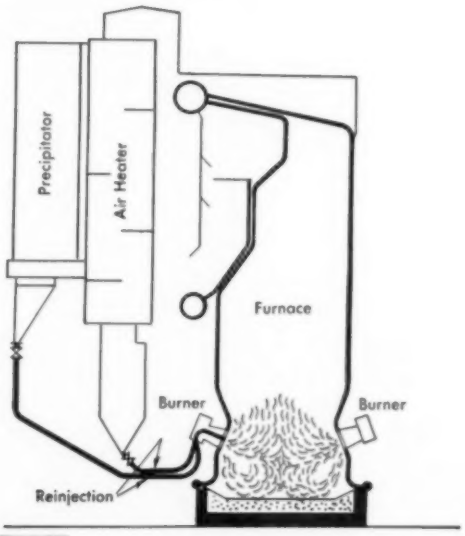

Figure 2

In 1952 a well known eastern chemical company had costly flyash disposal problems at two of its plants. At the time Riley Stoker Corporation had been developing a new type of slag tap furnace design to permit refiring flyash and disposing of it as slag. The idea was accepted. Two Riley boilers with the new furnace were installed . . . one to refire its own flyash, the other to refire its own and that of an adjacent conventional dry bottom unit.

The success of these boilers in eliminating the problem of flyash disposal is a matter of record . . . but the real success story lies in the other outstanding operating characteristics of this type of boiler unit, operating characteristics long sought by engineers and designers.

METHOD OF FIRING

Riley directional flame burners (Fig. 1) inclined slightly downward and located opposite each other in opposite furnace walls (Fig. 2) produce an extremely hot turbulent flame in a restricted, concentrated combustion zone just above the slag pool. Temperatures are high enough to maintain a fluid slag pool even at low loads.

MINIMUM CARBON LOSS

When flyash is refired in the combustion zone practically all the carbon in the ash is burned with residue turning to molten slag. Unburned losses are infinitesimal even in small boilers. Efficiencies of 90% and over are attained and sustained.

LOW FURNACE EXIT GAS TEMPERATURE

A "top secret" of the Riley *Turbo Furnace* is low furnace exit gas temperature produced by bottom-of-furnace firing. Temperature curves in Fig. 3 show *Turbo Furnace* exit gas temperatures at 100 F. to 220 F. below those of a conventional dry bottom unit operating at the same load, having the same capacity and the same amount of water cooling.

FURNACE EXIT TEMPERATURES THE SAME WITH ANY FUEL

The curves in Fig. 3 also indicate that in the *Turbo Furnace* the exit gas temperatures of a variety of fuels are approximately the same. For example, when burning natural gas the furnace bottom contour produces a luminous flame similar in size and appearance to coal flame; result: almost identical furnace exit temperatures.

USES A MULTIPLICITY OF FUELS

Because exit gas temperatures are so nearly identical with any fuel, the *Turbo Furnace* is uniquely suited for high steam temperature installations where uniform steam temperature is wanted while burning coal, lignite, gas, oil, fluid coke, or a combination of these fuels.

NO SOOT AND SLAG BLOWERS NEEDED

With retention of the major portion of ash in the furnace bottom and with resulting low temperatures in

An Advertisement Prepared By

Riley designs, manufactures and erects steam generating units complete with

Worcester New York Philadelphia Buffalo Pittsburgh Cleveland Detroit Chicago Cincinnati Charlotte New Orleans

FURNACE is so versatile

and does away with slag blowers
can be burned in it at any time
are attained and sustained

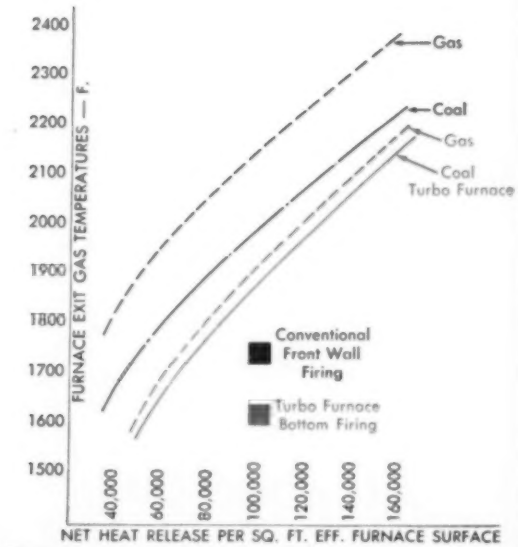

Figure 3

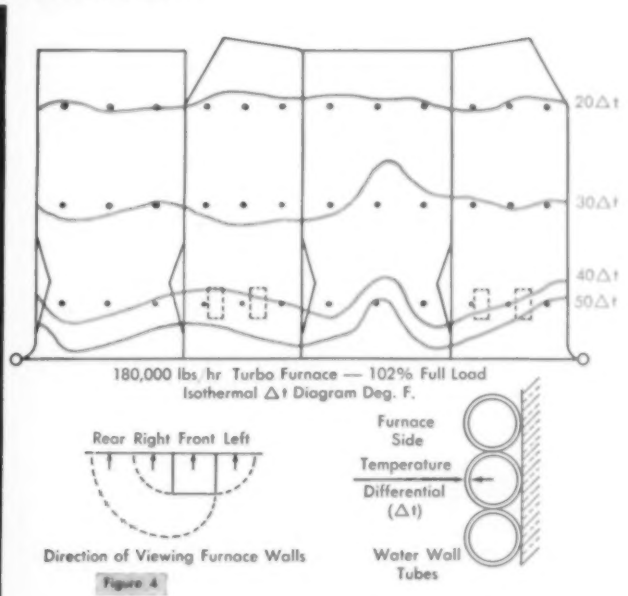

Figure 4

the upper part of the furnace no slagging occurs even with ash of lowest fusion temperatures. Since combustion is restricted to furnace bottom there is no impingement of flame on furnace wall tubes. Only a light dust coating on furnace walls and on convection tube bank occurs. (Fig. 4) illustrates the effect of the cleanliness of the *Turbo Furnace* . . . relatively flat isothermal lines obtained in tests on one of the chemical company's units from readings of centerline thermocouples.

SIMPLIFIED DESIGN AND CONTROL OF SUPERHEATER AND REHEATER

With heat distributed evenly within the furnace and constant temperatures maintained regardless of fuels used the design and control of superheater and reheater for the *Turbo Furnace* unit is greatly simplified.

OPERATION POSSIBLE EVEN WHILE CHANGING TO SOLID FUEL

With pressure parts constant for all fuels a *Turbo Furnace* installed initially to fire gas or oil and designed with a furnace heat release compatible with coal firing can "stay on the line" during installation and hook up of solid fuel handling equipment. No ash hopper has to be added, and Riley directional flame burners are already equipped with coal heads for quick connection to pulverizers.

HIGHER HEAT RELEASES SMALLER SETTINGS

With lower exit gas temperatures the *Turbo Furnace* can be designed for higher heat release rates of both furnace envelope and furnace volume. A smaller furnace without a hopper bottom results in lower overall height.

ONE LEVEL BURNER OPERATION

Burner operation at or near the turbine level has long been desired. The Riley *Turbo Furnace* with all its burners on one level near the bottom of the unit makes one level operation a practical reality.

VERSATILE OPERATING FEATURES REFLECTED IN RECENT PURCHASES

An eastern seaboard public utility will operate three 500,000 lb. per hour *Turbo Furnace* units designed specifically to burn fluid coke plus oil, gas, coal. A Louisiana public utility has ordered a 1,550,000 lb. per hour reheat unit to fire natural gas, but for future conversion to solid fuels. Three 320,000 lb. per hour *Turbo Furnace* units will be installed by a prominent aluminum producer for gas, oil and future pulverized coal. A Texas public utility has purchased an 825,000 lb. per hour reheat unit for natural gas and future pulverized coal or lignite. Another Texas public utility has ordered a 1,260,000 lb. per hour reheat unit for gas firing and future pulverized lignite.

Such acceptance of a relatively new design is recognition of the sound operating advantages involved.

RILEY STOKER CORPORATION *of Worcester, Massachusetts*

heat recovery equipment and fuel burning equipment for all industries and public utilities.

Atlanta St. Louis Kansas City St. Paul Houston Denver (Englewood) Salt Lake City Los Angeles San Francisco Portland Seattle

of shell pressure when changing from caustic introduction to the slow rinse, fast rinse or recycle phases, bed depression due to lack of shell contour at the bottom sight glass, whirling action of the entering water, too fast or too slow regeneration, and other causes. None of these corrected the situation.

It is definitely known that the resin in the odd numbered units is lighter and more porous than that in the even numbered units. This is shown by the greater bed expansion (approximately 25% more) during the backwash period for the same rate of backwashing. Care was used to determine this difference in backwash on exhausted resin, inasmuch as a regenerated resin is extremely light. Consequently, it seems that this light porous resin is quite sensitive to anything which might cause bed disturbances such as water velocity, temperature changes, etc.

Double or triple regeneration did not help conditions.

A two minute backwash with the finished water at 3 gpm per sq ft rate at the end of the fast rinse improved capacity of all units as much as 10%. Even the cation units improved. However, the odd numbered anion units continued to show periodic exchange capacities as low as 10 Kgr per cu ft.

These facts, and analyses of the resin in various locations and depths, indicated laneing during the service run, or during the regenerating cycle or both.

The dilution water used to dilute the 25% caustic to 5% and 7.25% is the raw well water. This water contains some free gas of nitrogen and it also is high (180 ppm) in sodium bicarbonate. The dilution water is heated in a heat exchange to 150 F, then mixed with caustic and 90 F dilution water to automatically give a 125 F caustic solution. Considerable gas is released during this procedure and it apparently becomes entrained in the anion resin bed, thus setting up laneing of the caustic solution.

On February 1, 1956, the caustic dilution water was changed to anion effluent which is free of all gases. Improvement in the exchange capacity of all the anion units resulted and the erratic performance of units 1, 3, 5, and 7 has ceased. However, units 1, 3, 5, 7 showed about 15% lower exchange capacity than units 2, 4, 6, 8. Further investigation revealed that we have lost about 15% of the resin in units 1, 3, 5, 7.

All units are now up to 20 Kgr per cu ft of resin.

The cause of loss of resin in the odd numbered units 1, 3, 5, 7 is as follows: These units, which frequently come out of service prematurely, still had considerable regenerated resin in the bed. Regenerated resin is very light and cannot be backwashed at high rates. Inasmuch as it has been our policy to backwash the anion resin at a rate to give 150% bed expansion for a duration of one and one-half changes of water (19 min.) some of this light regenerated resin inadvertently went overboard.

This backwash rate and its duration is definitely essential to get rid of undesirable products in the bed and on the resin.

When it becomes necessary to clean a bed by backwashing at 6 gpm per sq ft and the resin is very light or insufficient space exists for resin expansion, it is possible to backwash at high rates for a short time (say three minutes) then settle for three minutes. This procedure can be repeated as many as six or ten times until the resin is clean and the effluent is clear. At least two changes of water is advisable before judging if the effluent is satisfactorily clear.

TABLE II

BOILER WATER WALL DEPOSIT X-RAY ANALYSIS

Constituent	%
Hydroxyapatite $Ca_{10}(OH)_2(PO_4)_6$	30
Hematite Fe_2O_3	40
Copper Cu	10
Amorphous organic material	20

CHEMICAL ANALYSIS

Constituent	%
Fe_2O_3	35.4
Cu O	20.1
P_2O_5	1.4
SiO_2	2.3
Diff.	40.8

Diff. = difference, which is mostly organic matter and a small amount of sodium. No other metals found other than iron and copper.

We now feel that, in the future, units 1, 3, 5, 7 will equal the performance of units 2, 4, 6, 8 when their bed depths have been restored to normal.

Boiler and Turbine

Since January 1954 the load on the 1,500 psi boilers and turbines which use 100% deionized water was gradually increased. They have operated at 110% rated load daily with no loss of capacity.

In November of 1955 it became necessary to remove the one and only deaerator from service. This reduced the load per boiler from 600,000#/hr to 400,000#/hr because the temperature of the water entering the boiler was reduced from 350 F to 100 F. All elimination of oxygen was done by chemical treatment with sodium sulfite.

Soon after this, one of the water wall tubes in one boiler began leaking. The boiler was removed from service, inspected, and chemically treated for scale removal. Over 90 pounds of scale was removed from the boiler. However, a considerable amount of scale must have been flushed out during the chemical treatment. About the same amount of scale was removed from all three boilers.

The two boilers with washer type steam baffles had the greatest water wall tube thickness of scale at the burner level, whereas the scale in the boiler with the screen type steam baffle was evenly distributed. The analysis of the scale is given in Table IV.

The source of iron and copper in the boiler scale was due to the presence of 0.04 ppm H_2S and 0.3 ppm O_2 in the deionized water in the predeaerator cycle. The pH was 8.8. The oxygen leaving the deion plant degasifier has been reduced to 0.01 ppm by correcting leaking of air through the shaft of the degasifier pumps. We are continuing to feed sodium sulfite to keep zero oxygen in the water to the deaerator. The pH has been raised to 9.0. The hydrogen in the steam to the turbine is 4 ppb.

Initially all the steam from the 1,500 psi boilers was desuperheated with deionized water from the boiler feed pumps. The turbines were not yet in service. This made it inadvisable to feed any chemi-

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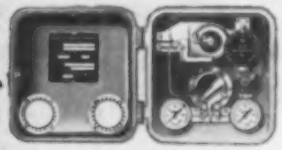
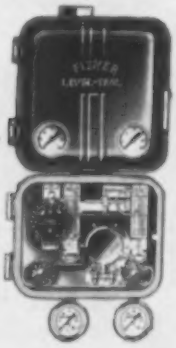
TYPE 259B—Level-Trol cage unit with 2" 600 lb. flanged top and bottom equalizing connections (F-1).

TYPE 2500—proportional pilot for general liquid level control applications.



TYPE 2500T — Level-Trol pilot used as pneumatic level transmitter.

TYPE 2500C—pilot with level indicator. Indicator available on all style Level-Trol pilots.



TYPE 2500 — 2516 dual Level-Trol pilot consisting of Type 2500 for remote level-indication or recording and Type 2516 controller with proportional and reset response.

The wide variety of pilots available for mounting on the Level-Trol gives further evidence of the Level-Trol's ability to handle practically any liquid level, interface level, or specific gravity control or indication problem.

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"We had as many as 24 Solenoid coils a month burn up before we installed BUSS FUSTATS" . . .

"Now our burned up coil losses are negligible."

C. R. Babcock, CHIEF ELECTRICIAN
DEWEY PORTLAND CEMENT CO., DAVENPORT, IOWA

Mr. Babcock continues ——

"The burning up of the solenoid coils that activate the plungers that dump our weighing scales was a real problem with us. We lost as many as 4 coils on one 8 hr. shift. The maximum was about 24 coils a month.

"Trouble develops on the days when the gypsum for our cement picks up moisture and sticks to the scales. Then the counterbalance can't reset the scale and, as a result, the plunger moves up and down energizing and de-energizing the thrust coil. The coil has only a few turns of large copper wire and draws a heavy current each time it is energized. It heats up quickly and burns up.

"To give over-load protection to the thrust coil, which is on a 125 volt DC power supply, we installed a 3.2 BUSS Fustat in a series with the coil. (BUSS Fustats are FUSETRON dual-element fuses with a type S base for use on circuits up to 125 volts.)

"Now, when there is trouble the Fustat opens before the coil is damaged. The scale is cleaned and another Fustat installed. We are then back in operation.

"We have three of these scales and at the present time we are replacing only about one coil a month and this is generally due to mechanical and moisture damage.

"We figure BUSS Fustats save us money in two ways — by practically eliminating the cost of replacing solenoid coils — and by greatly reducing our down-time losses."

On circuits of 125 volts or less —

The Proper Size BUSS Fustat can Reduce Danger of Burnout of Solenoids, Coils, Transformers and Motors

A BUSS Fustat is a Fusetron dual-element fuse with a type S base for use on circuits of 125 volts or less. A Fustat gives all the protection of a fuse against short-circuits or dangerous overloads — yet, it permits circuit to be loaded safely to maximum capacity.

Protecting Solenoids, Coils and Transformers —

By installing the proper size Fustat, a solenoid can be protected because the Fustat will not open on the operating surge but will open in time to protect, should the heavy current continue too long for any reason.

A transformer or coil, likewise, can be protected because the long time-lag of the Fustat permits it to hold all normal current surges and harmless overloads — yet it will open to prevent burnout on any dangerous overloads.

Protecting Motors against burnouts —

A BUSS Fustat of motor-running protection size mounted anywhere in the circuit to handle ONLY the motor current will give finest available protection against burnout of the motor.

Nothing else is needed. Underwriters' Laboratories listing gives Fustats same degree of approval for both motor-running and short-circuit protection as the most expensive devices made.

BUSS Fustats stop dangerous practice of tampering or overfuseing

The type S (tampering resisting) base of a Fustat prevents anyone replacing them with an ordinary fuse, a penny or other substitute — or with a size too large to protect.

Fustats fit ordinary Edison base fuse holders through use on an inexpensive adapter that once installed need never be replaced.

Write for bulletin SMPS.

On any circuit up to 600 volts — Use a FUSETRON dual-element Fuse.

Fusetron fuses protect motors, solenoids, coils and transformers against burnout; they offer maximum safety because of their 100,000 amp. interrupting rating; they help increase production by eliminating needless blows and they cut maintenance costs because they are maintenance free.

Write for bulletin FIS . . .

For loads above 600 and up to 5,000 amps. — Use BUSS Hi-Cap Fuses.

When coordinated with Fusetron fuses they will not open ahead of the fuse nearest fault . . .

Write for bulletin HCS.

Play Safe! **Install BUSS Fustats, FUSETRON Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!**

Bussmann Mfg. Co. (*Division of McGraw Electric Co.*)
University at Jefferson, St. Louis 7, Mo.

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

cals to reduce the 0.3 ppm O_2 coming from the Deion Plant because it might badly foul up our 600 psi turbines. Under present conditions, we will accept any possible short time fouling, if desuperheating becomes necessary. However, sulfite may eliminate deposits instead of causing them.

Studies are now underway as to the best ways and means of preventing water wall tube deposits and to reducing organic matter. At present we are using the co-ordinated phosphate treatment in the boiler water. The deion plant effluent water which feeds the boiler plant is being treated with catalyzed sulfite, hexameta phosphate, and morpholine to keep the pH at 9.0. Consideration of feeding some hydrazine and/or ammonia have been rejected to date because of its possible undesirable effect at the location where process steam is used.

Inspection of a boiler water wall tube after two months operation indicated much improved but not completely satisfactory deposit conditions. Thermocouples installed on the water wall tubes show no increased wall tube temperature after two months operation. We are attempting to use these thermocouples to give us an idea as to the rate of build up of deposit in the tubes and thus tell us when the boiler should be removed for cleaning. The couples will also be used to give us an indication as to better internal water treatment and external firing conditions.

Conclusion

It has become apparent that deionized water is as aggressive as condensate is in our standard condensing low makeup units where pH, O_2, CO_2, etc. must be under control. We have the added problem of eliminating organic matter, which now seems paramount. Use of deionized water at 1,500 psi and 100% makeup has resulted in clean turbines with no loss of capacity. We expect to operate the boilers with no deposits in the near future and the deion plant should continue to function at its peak economy while delivering water of very high quality.

A Summary and Interpretation of Developments

Atomic Trends

By JOHN F. LEE

Professor of Mechanical Engineering
North Carolina State College

ECONOMIC, social, and political implications of the peaceful uses of nuclear energy are producing an unprecedented alliance of interests which promises the most spectacular concentration of effort ever witnessed in the history of engineering.

The impact of nuclear energy on existing industries and in spawning new industries is being felt on a national scale as evidenced by the almost frantic efforts of regional groups to secure for themselves a share in the benefits of this new potential. Developments are so swift and subject to such a wide variation of interpretation that the reader is likely to become bewildered. It is for this reason that a concise summary and interpretation of developments is given here periodically.

Power Plans

The Joint Congressional Atomic Energy Commission was urged by Commissioner Thomas E. Murray of the Atomic Energy Commission to expend $1,000,000,000 per year during the next five years for a development program in nuclear power plants. Mr. Murray stated that we are facing a nuclear power race with Russia which parallels the nuclear weapons race. He warned that Russia is threatening to steal world leadership in the development of nuclear power.

Murray's proposal calls for the expenditure of a total of $5,000,000,000 which insure a generating capacity of 2,000,000 kilowatts in nuclear power plants by 1960 and a total of 10,000,000 kilowatts by 1965. In an earlier secret session Mr. Murray showed conclusive evidence that the nuclear weapons program had reached such a state that there is adequate nuclear fuels to support both the weapons program and the proposed nuclear power plant program.

It is believed that the size of the present nuclear weapons stockpile motivated President Eisenhower's proposal to sell or lease 88,000 pounds of uranium-235 for peaceful uses in this country and abroad.

Although Mr. Murray's proposal received a warm reception from the Congressional Committee, statements made by other members of the Atomic Energy Commission showed that the atomic power proposal was not generally supported by the Commission.

Isotopes in Industry

One of the less publicized uses of nuclear energy received its share of attention when Dr. Frank W. Libbey, a member of the Atomic Energy Commission, declared that radioactive isotopes were saving industry between $200,000,000 and $300,000,000 annually. He predicted that savings effected through the use of radioactive isotopes would climb to $1,000,000,000 annually within the next ten years.

These figures, he pointed out, exclude the benefits related to nuclear weapons and medicine. In addition to the above figures, Dr. Libbey estimated a present annual saving of $100,000,000 in agriculture due to the use of radioactive isotopes.

In five years the use of radioactive isotopes has increased twelve times. The number of companies using isotopes in 1950 was only one hundred. Today there are about 1250 industrial firms making use of isotopes for processing and quality control. Dr. Libbey said that it is simply a matter of discoveries, inventions, and applications in the extended use of radioactive isotopes.

Some common industrial uses of radioactive isotopes include wear measurements, thickness gauging, location of leaks, battery development, process control, improving properties of materials, quality regulation, and tracing behavior of additives. These are only a few applications on a list that extends to hundreds.

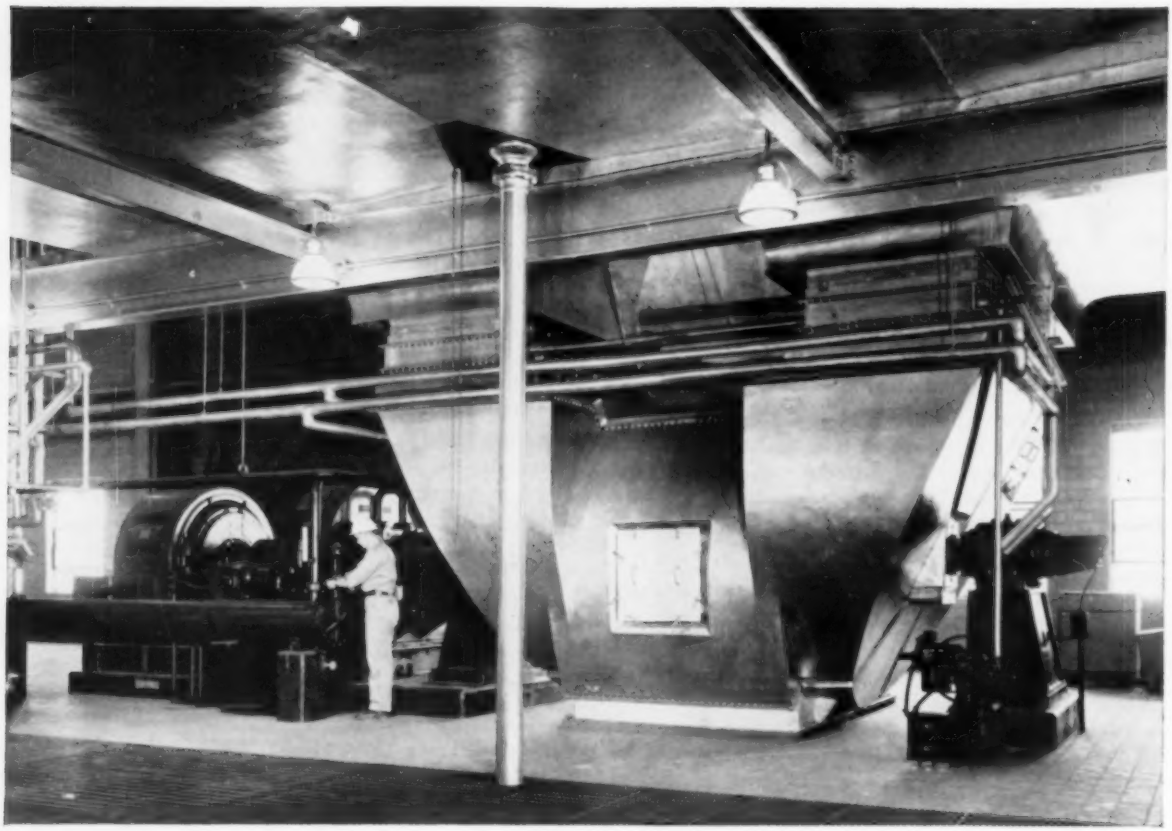
It is generally felt that more extensive use of the isotopes will be made when more industrial firms become better acquainted with their potentialities. For example, Dr. Libbey pointed out that the hydrogen isotope, although the cheapest one available, has not been used in the organic chemical industry because its usefulness in these processes has not yet been fully realized.

Chemical Industry

The Manufacturing Chemists' Association, Inc., conducted a survey of its membership to determine the impact of nuclear energy on the chemical industry. The Association includes 150 corporate members who account for 90 per cent of the productive capacity in the United States for such products as organic chemicals; inorganic compounds, including acids and alkalies and their salts; plastic materials; gases such as chlorine; synthetic fibers; pesticides; and thousands of other compounds.

The survey showed that nuclear energy has made a significant impact on the chemical industry and it is expected that the impact will continue to grow. The role

American Blower Mechanical Draft

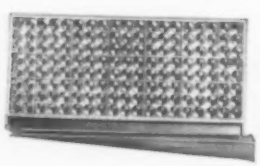


American Blower Induced Draft Fans meet the rigid requirements of modern power plants, where maximum pounds of steam are constantly produced at peak efficiency. Here are a few of the many features they offer:

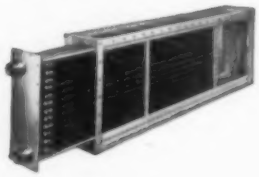
- High static efficiency, low R.P.M.
- Minimum boiler "outage"
- Certified ratings, minimum maintenance
- Minimum space requirements

To meet your exact specifications and ensure reliable performance, American Blower mechanical draft equipment is accurately formed and welded, fan rotors are perfectly balanced and tested, and all final assemblies are minutely inspected.

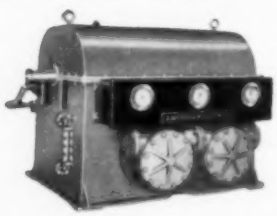
Other American Blower Heavy-Duty Equipment for Power Plant Applications



Collectors and precipitators for dust and fly ash control

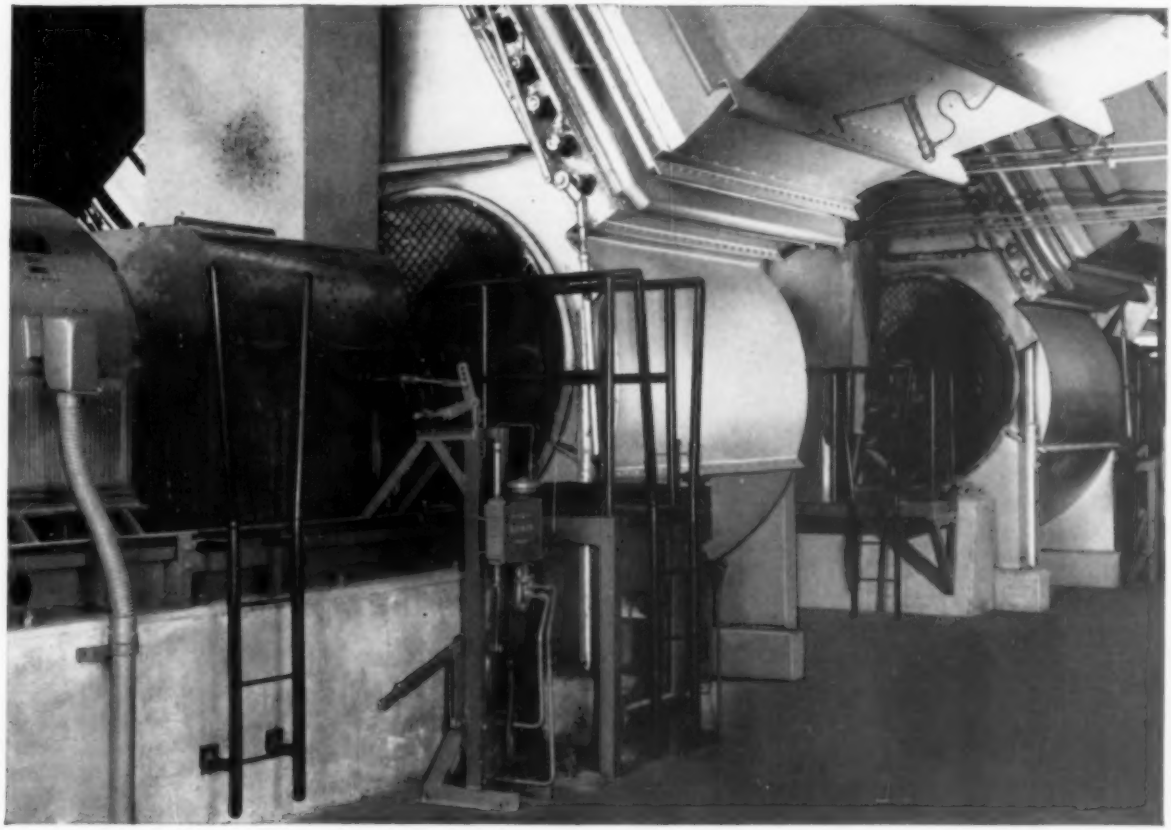


Heavy-duty steam coils for high-pressure duty



Gyrol Fluid Drives for boiler feed pump and fan control

Fans meet peak-efficiency standards



American Blower Forced Draft Fans are suitable for either indoor or outdoor installations. Each type of fan is carefully developed and its performance-rating guaranteed. Here are some of the reasons why American Blower Forced Draft Fans are widely accepted by power plants throughout the nation:

- Certified ratings
- Heavy reinforced housings and wheel-shaft assembly designed with first critical well above maximum operating speed
- Special streamline inlets designed for all wheel types to obtain high efficiency
- Choice of bearings to fit any application

If your plans include mechanical draft equipment—for new installations or as replacements—consult your American Blower sales engineer. He can give you helpful information on job-fitted American Blower equipment to meet your power plant requirements. Call our nearest branch office or write: American Blower Corporation, Detroit 32, Michigan. In Canada, look for Canadian Sirocco products.

AMERICAN BLOWER

Division of American-Standard

of the chemical industry in reprocessing nuclear fuels and the utilization and/or disposal of radioactive waste products is clearly evident. Radioactive by-products from reactors are already being used to sterilize certain foods and pharmaceuticals. Radiation is playing an important role in the production of new plastics as well as providing a means to initiate and catalyze new chemical reactions.

An important factor to the chemical industry is the possibility of cheap atomic power permitting companies to locate wherever desired. It is predicted that "energy where you want it" will change the geographical distribution of the chemical industry.

The survey cited an increased demand for chemicals such as acids, alkalies, fluorine compounds, chelating agents, ion exchange agents, precipitants, extractants and for new chemical products such as plastic will go hand-in-hand with the development of atomic energy.

New products now in production and attributable to nuclear energy applications are: zirconium, hafnium, impervious high density graphite, radiogenic lead, heavy water, boral, heat transfer alloys and liquids, strontium, rare earths, rare metals and salts, liquid metals, thorium, beryllium and vanadium.

Reactor Laboratory

Battelle Memorial Institute in Columbus, Ohio, has completed a reactor development laboratory which is similar in purpose to the one under construction at Lynchburg, Virginia. The laboratory provides test facilities for determining the feasibility of theoretical designs for reactors up to 200,000 kilowatts of capacity. The new laboratory is the second major unit in Battelle's Atomic Energy Center.

Citizens' Panel

One of the most significant steps forward in the development of peaceful uses of atomic energy came in the form of a report prepared by a panel appointed by the Joint Committee on Atomic Energy of Congress. The panel was known as the Citizens' Panel on the Impact of the Peaceful Uses of Atomic Energy.

The recommendations of the Citizens' Panel are so detailed and comprehensive that they will be marked as the turning point in the future history of atomic energy development. If the recommendations are carried out all previous predictions for the general application will be drastically revised upward. Anyone who has any interest in the industrial uses of atomic energy, no matter how remote, should purchase a copy of the report from the Superintendent of Documents in Washington.

The Panel struck at beaurocratic policy which lends aid to the development of atomic energy while throttling its development by a maze of red tape and unjustified secrecy. It calls for an end of centralized control in the Atomic Energy Commission and recommends that the Commission act as an adviser, aid and coordinator in a unified national effort to develop the peaceful uses of atomic energy. If the restraints are removed from atomic energy development, the Panel predicted a bountiful future for the country in which atomic energy can add immeasurably to our resources while improving the physical well-being of people everywhere.

The major recommendations unanimously approved by the Panel are:

1. The Government should build demonstration nuclear power plants of each reactor size and type if private capital did not undertake to do so in the immediate future.

2. The Atomic Energy Commission should declassify all information concerning the technology of nuclear reactors.

3. The Atomic Energy Commission should abandon the policy that all new knowledge is labelled secret.

4. The Atomic Energy Commission should provide a means for more scientists to participate in the now top-secret fusion program to speed the development of nuclear fusion power.

5. The United States should make available "know-how" and materials for generating 1,000,000 kw of nuclear power in foreign countries by 1960.

6. The Atomic Energy Commission, the Maritime Commission and commercial shipping concerns should be encouraged to explore the economic possibility of atomic-powered ships in the period 1960-65. The panel ruled out atomic powered automobiles as infeasible for the foreseeable future and recommended that nothing be done, at present, about atomic locomotives. It recommended that commercial nuclear aircraft await the outcome of military development program.

7. The agricultural applications of atomic energy should be thoroughly explored for humanitarian purposes but with a careful eye on food surpluses in this country.

8. Generous support should be given, both in money and facilities, to universities for basic research and reactors should be located for the greatest use to the greatest number of university scholars.

9. The Joint Committee on Atomic Energy of Congress should take steps to insure a continuing review of the present policy of Government ownership of all special nuclear materials with a view to establishing private ownership.

10. The Atomic Energy Commission and other appropriate Government agencies should work with State and local authorities in establishing a uniform code of safety and health regulations relating to atomic hazards.

11. The Joint Committee on Atomic Energy of Congress should immediately investigate the propriety of restrictions placed on the activities of American firms doing nuclear energy business in foreign countries.

The findings of the Citizens' Panel will undoubtedly have a large influence on atomic legislation in the present session of Congress. As a result a large number of industries are expected to take a plunge into the atomic energy field. The Nation up to now, in the words of Walter P. Reuther,

(*Continued on Page* 108)

Computer applications . . .

Fast Calculations at Lockheed — Atlanta

THE SOUTH'S largest and most advanced concentration of industrial electronic "brains" has been put in operation at the Georgia Division of Lockheed Aircraft Corporation, Marietta, to speed development of nuclear powered and other aircraft designs.

Actually, there is a "scientifically minded computer" (IBM 704) for use in engineering computations and a "business minded computer" (IBM 705) for tackling processing jobs such as pay rolls, parts listing, accounts payable, inventory control and production control. International Business Machines Corporation describes the Lockheed-Georgia installation as a "multimillion dollar electronic brain center, one of the most advanced and well equipped in the world." The "business" machine is the largest type "brain" in the world and is the first one of its kind in operation in the South. Only eight are in existence.

The machines solve difficult problems with incredible speed. The time required for solving or assimilating problems is measured in milliseconds — millionth parts of a second.

For instance:

A machine could figure out your income tax in less than a second!

It can add 40,000 ten digit numbers in one second!

It can multiply ten digit numbers at the rate of 2,000 a second!

It will compute the Lockheed payroll for 18,000 employees, making all necessary deductions individually, all overtime, time, rates and salaries in 45 minutes!

In addition to payrolls, it will be used for vendor payments, disbursement of material and analysis of engineering requirements and tabulating shop orders.

A machine is on order for use in connection with the nuclear test facility being built by Lockheed to operate for the Air Force at Dawsonville, Georgia. It will enable engineers and scientists to evaluate complicated mathematical and chemical formulas in a matter of minutes, instead of days. It is a "scientific minded" machine geared to the needs of scientists and aircraft designers.

Production Aid

All three machines, Lockheed officials say, will enable them to cope with more problems than ever before by obtaining results over a shorter period of time.

Estimation of manpower requirements for the modification of C-130 Hercules and B-47 Stratojets, previously a time-consuming job, is considerably shortened by using the electronic data computing machine.

Where it formerly took about 1,000 hours to feed information, compiled by the Direct Hours Control department, through a series of electronic machines to obtain facts on which to base decisions, the same facts can now be obtained in a half hour on this new "business-minded" machine.

This shortened time enables management to make faster and more accurate decisions as to redistribution of manpower when a contract is beginning or ending.

Far from replacing statistical personnel, the electronic brain opens an entirely new field for those who have specialized in the field of higher mathematics.

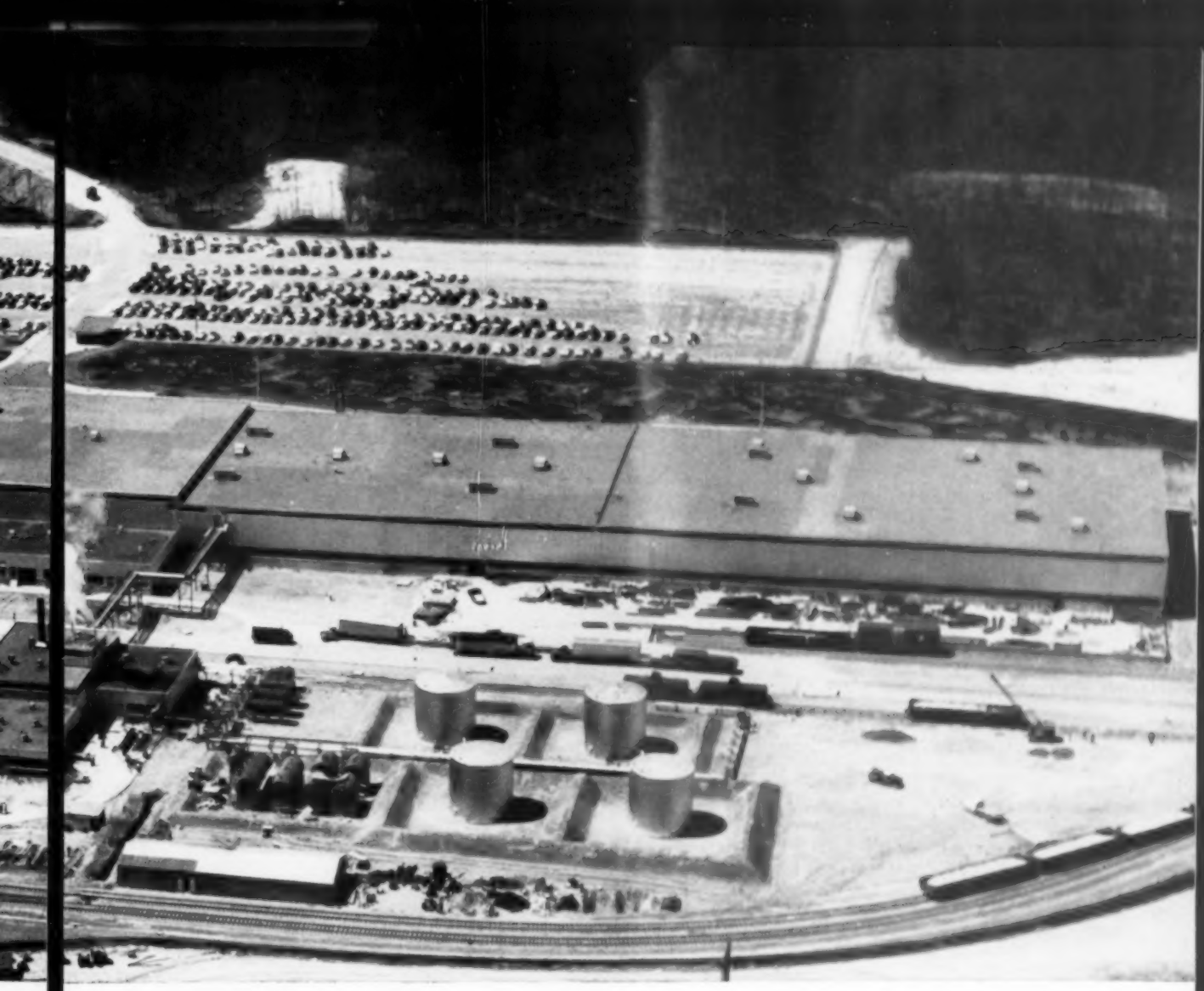
More of a robot than a "brain," a term disliked by IBM and aircraft engineers and scientists, it has to be given information before it can relay answers. Therefore, the highly trained technician and engineer is still required to analyze the basic problem. However, instead of working the problem out by the old-fashioned calculator and slide-rule method, he can now feed the information into the "memory" of the electronic computer where it is available for rapid computation as needed.

Both the 704 and 705 were manufactured by International Business Machines Corporation at its Poughkeepsie, N. Y. plant. The machines use the stored program principle: that is, they solve a problem or process data by following a set of instructions previously stored in the machine's "memory." The principal advanced feature of the 704 and 705 is the high-speed magnetic core storage or "memory." This replaces the electrostatic or cathode ray tube — similar to a TV tube — storage used in earlier machines. An individual magnetic core is about the size of a pinhead and is shaped like a doughnut with a hole in the center. In a single machine, thousands of cores are strung on a complex of wires in such a fashion that several wires pass through the center of each core. Combinations of electrical pulses on these wires alter the magnetic state of the tiny cores. A line of cores, some altered, some still neutral — for instance in this manner, X-X-O-X-O-O-O-X-X-X — stands for a certain number or word, just as dot-dot-dot dash-dash-dash dot-dot-dot stands for SOS in Morse code. A word or number so coded and stored in the magnetic core memory is available for calculation in 12 millionths of a second. The memory is expandable to the equivalent of 327,000 decimal digits in this high-speed storage. In addition, both machines have vast magnetic drum and magnetic tape storage facilities for data that is not referred to as often.

and electrical growth in the South

New General

G-E Conventional and Self-protected Distribution Transformers



Electric Transformer Plant

A progress report on construction at Hickory, N. C.

Early in 1955, ground was broken for a new General Electric distribution transformer plant near Hickory, N. C. Major construction has now been finished and machinery is being installed. Limited production has already gotten under way.

With the increase of industrialization and construction in the South, there is a greater demand for electrical distribution equipment from utility and industrial users. By locating this plant in the South, General Electric will be able to provide even better service on distribution transformers to Southern customers.

Eventually about 1000 people from the Hickory-Newton-Conover area will be employed at the new plant. This will be the second major transformer plant General Electric will have operating in the South. A Medium Transformer Plant was opened in Rome, Georgia, in May, 1954. Both of these plants are General Electric's answer to the booming electrical industry in the South. General Electric Company, Schenectady 5, N. Y. 431-47

Progress Is Our Most Important Product

GENERAL ELECTRIC

Combination Work Bench and Parts Bin

THIS COMBINATION work bench and parts bin for repairing meters has proved particularly advantageous.

Design features one compact unit for overhauling meters on every make and model. Small bins across the top are used for storage of small parts and fast moving supplies. The 9" by 9" bins are used for larger parts and larger gaskets while the long bins across the bottom are used for the meter head gaskets and other long or bulky material. Each bin is within easy reach of the repairman's stool.

A work bench extends back between the two bins 12" allowing an easy and convenient work bench for detail meter repairs. This work bench has a 12" extension across the entire front of unit to provide space for vise, bellows clamp and other tools. Entire bench has been built with a slope to the rear left, allowing all fluid to flow from bench and into a can provided at the low point. A quarter inch flange has been turned up around the outer half of the bench to prevent fluid from spilling over on the floor or employees lap. The unit is built on an angle iron frame with ball bearing casters mounted on each corner, allowing unit to be moved to any desired location in the shop. Space between parts bins is floored with 2 x 6 lumber.

This convenient arrangement of all parts, tools and equipment saves the mechanic's time in completing meter repair.

By KENNETH E. COSSEY, Mechanic, Maintenance Shop, Humble Oil & Refining Co., Irving, Texas.

Answers to Questions About Diesels

WHAT ARE the principal differences between diesel and gasoline engines? How do diesels operate? What are the principal advantages of diesels compared to gasoline engines? Why do they give these advantages?

The answers to these and many other questions about diesel engines are contained in a new 24 page booklet "Answers to Questions About Diesels" available from any Cummins distributor or direct from the Cummins Engine Company, Inc., Columbus, Indiana.

Each question is asked and answered in simple non-technical terms, for example: "What is fuel energy? Fuel energy is measured in standard heat units (Btu) and gives a comparison of the power possible from different fuels. As a diesel engine converts a greater percentage of the heat units in its fuel into power at the flywheel than any other type of power plant, it is the most efficient type of power. Diesel fuel has more heat units (Btu) per gallon, and so gives more work per gallon of fuel consumed."

Fumes Pushed Away

SAFETY ENGINEERING involving the use of portable air movers permitted Industrial Painters and Sand Blasters of Little Rock, Arkansas, to handle economically a tough assignment for the Corps of Engineers.

The painters ran into major ventilation problems — in painting the exterior of the 690 ft steel conduit which was located inside of a concrete tunnel. Mine Safety Appliances Company-Lamb Air Movers were brought in and enabled painters to work without fear of toxic or explosive vapors.

The principle of the Air Mover is that of a venturi. Compressed air is fed to the mover and due to the turbulence of its discharge through the orifice, additional air is sucked through the bell of the unit. The ratio of air sucked through to that actually injected under pressure is about 10 to 1.

The conduit was 24 ft in diameter and the tunnel only 30 ft in diameter. That left three feet of working room on each side. To complicate the job, the tunnel was dead end upstream. Therefore, there was no flow of natural air.

Catwalks on either side of and parallel to the steel conduit ran the length of the tunnel. This made it possible to spread tarpaulins on the catwalks and divide the tunnel into two equal air spaces.

While the top side of the conduit was being painted, two Air Movers were placed in the lower section of the tunnel and forced air toward the dead end of the tunnel. Three six-inch Air Movers were placed in the top section of the tunnel just behind the painters and forced air toward the tunnel's open end.

Air was moved at a rate of 5,714 cfm toward the dead end of the tunnel by the two Lamb Air Movers located in the bottom half of the tunnel and 7,571 cfm toward the open end with the three Lamb Air Movers on top. Most of the air moving to the dead end of the tunnel was fresh air.

When the bottom half of the conduit was being painted, the procedure was reversed.

Inside story:

Valves may look alike on the surface. Their performance is another story. And the inside story of Powell Valves is that *every* Powell Valve has *Performance Verified.*

X-ray and gamma ray inspection—examining the very structure of the metal itself—are two of the many ways that Powell can make absolutely certain that Powell Valves will give *dependable* flow control.

Every part of every valve must pass rigid inspection. As a final step in manufacture, every Powell Valve is subjected to *an actual line test.* Because of Powell's pains-taking quality control, valve repair is cut to the minimum and plant shut down through valve failure is substantially reduced. Records from refineries, power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE *quality line* which has PERFORMANCE VERIFIED.

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR

PERFORMANCE PV VERIFIED

FIG. 19003 WE—900-Pound Steel Pressure Seal Gate Valve.

FIG. 11365 WE—Steel Pressure Seal Horizontal Lift Check Valve for 1500 Pounds W.S.P.

FIG. 3031 WE—Steel Globe Valve for 300 Pounds W.S.P.

POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

Welding Chrome-Moly

WELDING chrome-moly steels used in high temperature high pressure piping systems has always been a problem because of their tendency to harden and become brittle while cooling down from welding temperatures.

A development, recently introduced by Metal & Thermit Corporation, reduces the cost of making and maintaining welds on the chrome-moly steels. Known as the Croloy system, the new method offers a number of important advantages.

THE CROLOY system enables the welder to produce sound welds on chrome-moly steels at minimum time and expense.

The highly ductile weld metal practically eliminates weld cracking. Preheating and post heating can be done at lower temperatures, speeding up the work. Except on heavy sections, preheat need not be maintained after welding, and many welds can be placed in service without stress relieving. The straight lime coating of the electrode used produces sound, clean weld metal, free from porosity and suited for work requiring radiographic examination.

Technique

The new Croloy method is an arc welding system designed for reverse polarity, direct current welding in all positions. It employs a special low hydrogen electrode with carbon content held at .05% max. and with straight lime coatings. Classified under AWS and ASTM specifications as Type XX-15, these electrodes provide a weld metal of controlled analysis and high ductility. This type of coating maintains ductility regardless of condition of preheat, post heat, interpass temperature or rate of cooling of the weld metal.

Joints should be carefully fitted and the root opening should be wide enough to insure good penetration. Where no root opening can be provided, the included angle should be not less than 90 degrees. When a root opening of ⅛ inch or more can be provided, the angle may be reduced to 60 degrees or less.

The weld area must be carefully cleaned to remove all scale, oil or rust, because the accidental inclusion of any source of oxygen may seriously interfere with the quality of the deposit.

The Croloy system permits welding at preheats from 100 to 200 degrees below temperatures usually considered necessary for these steels.

The arc should be held very short in order to avoid the introduction of air, with resultant difficulties from oxidation of the weld puddle. Excessive tilting of the electrode will also cause trouble because this permits air to enter the arc zone. In general the electrode should be held at an agle of 90 degrees to the work, and the weld metal deposited with a weaving technique.

The Murex Croloy electrodes provided for this system are available in four formulations, to supply varying percentages of chromium in the weld metal deposit. Elevated temperature properties of weld metal deposits of each of these grades have been found equal or superior to those of the base metal of equivalent chemical analysis.

Atmospheric Corrosion of Non-Ferrous Metals

ASTM Special Technical Publication No. 175, 164 pages, 6 x 9, heavy paper cover, $2.75

THIS SYMPOSIUM covers one of the most comprehensive test programs for the measurement of atmospheric corrosion properties of non-ferrous metals and alloys ever attempted. The exposure tests were started twenty-seven years ago by Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys.

The materials utilized included 24 wrought alloys of zinc, nickel, copper, lead, tin, and aluminum. These were exposed at nine significant localities across the country and evaluated after periods of 1, 3, 6, 10 and 20 years, embracing about 9000 test specimens.

The test report lists all data gleaned from these specimens and nine papers discuss in detail the significance of these results in each metals field. Introduction was by W. H. Finkeldey and papers included are:

Resistance of Aluminum - Base Alloys to 20-Year Atmospheric Exposure—C. J. Walton and William King.

Effect of 20-Year Marine Atmosphere Exposure on Some Aluminum Alloys — Fred M. Reinhart and George A. Ellinger.

Effect of Natural Atmospheres on Copper Alloys: 20-Year Test—A. W. Tracy.

The Atmospheric Corrosion of Copper — Results of 20-Year Tests—D. H. Thompson, A. W. Tracy, and John R. Freeman, Jr.

Atmospheric Galvanic Corrosion of Magnesium Coupled to Other Metals—H. O. Teeple.

Galvanic Couple Corrosion Studies By Means of the Threaded Bolt and Wire Test — K. G. Compton and A. Mendizza.

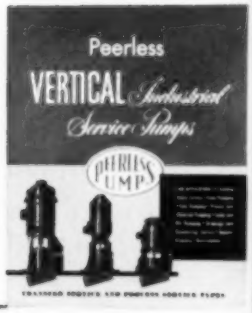
The Atmospheric Corrosion of Rolled Zinc—E. A. Anderson.

The Use of Lead and Tin Outdoors—George O. Hiers and Elbert J. Minarcik.

Atmospheric Corrosion Behavior of Some Nickel Alloys—H. R. Copson.

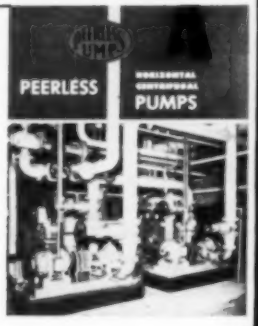
Copies of this publication can be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. at $2.75 each.

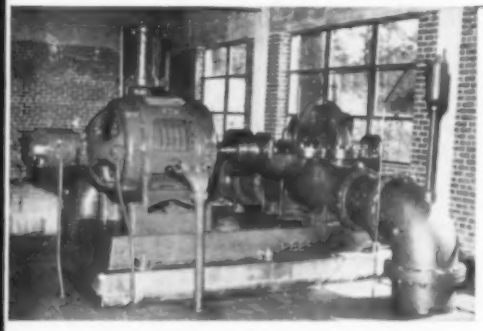
look AT THE PUMPING PROBLEM *two ways*



VERTICAL

Ho Rizontal





PEERLESS PUMP DESIGNS PROVIDE THE RIGHT TYPE FOR DOING THE JOB BETTER

You pick the design; Peerless will supply the pump. From one of the broadest range of pump capacities, heads, horsepowers, you can choose a Peerless horizontal or a Peerless vertical pump for almost every liquid transfer job, involving either water or process liquids.

In the picture at the top above, a concentrated solution of sulphuric acid and aluminum sulfate is being pumped by Peerless vertical industrial service pumps. To find out all about them request Peerless Bulletin No. B-505.

The Peerless horizontal type A pump shown just above, is one of three that supplies plant water for a textile mill. To find out all about them request Peerless Bulletin B-1300 and B-1350.

Use the coupon below to find how these Peerless designs can meet all your pumping needs with economy, efficiency and dependability.

PEERLESS PUMPS

fmc

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Factories: Los Angeles 31, Calif., and Indianapolis 8, Ind.
Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis, Ind.; Phoenix; Fresno; Los Angeles; Plainview and Lubbock, Texas; Albuquerque, New Mexico.
Distributors in Principal Cities. Consult your Telephone Directory.

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

Please send bulletins checked below:

- ☐ PEERLESS INDUSTRIAL SERVICE PUMPS (B-505)
- ☐ PEERLESS TYPE A HORIZONTAL PUMPS (B-1300)
- ☐ AND TYPE AS (B-1350)

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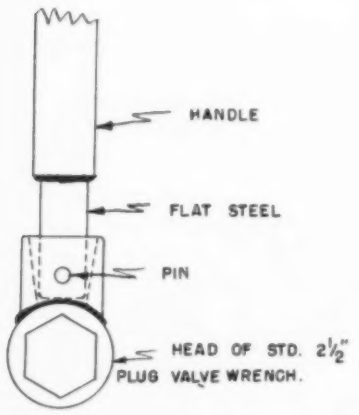
SP&I

Plug Valve Wrench

HARD-TO-TURN plug valves are easier to adjust with this modified wrench.

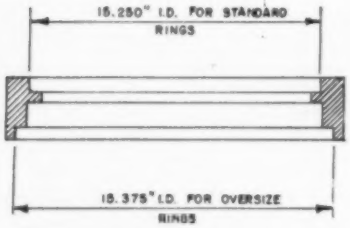


After removing the handle from a standard 2½ in. plug valve wrench, a steel block with a tapered slot cut out of it is welded to the head. A flat piece of steel is fitted into the slot and connected to the block with a heavy pin as illustrated in the drawing. The handle is then welded to the flat piece of steel. This arrangement provides a hammer action to assist in regulating hard-to-turn valves.

By HOWARD E. DORRIS, Pumper, Galveston Bay District, Humble Oil & Refining Co., Houston, Texas.

Piston Ring Gage

THIS RING GAGE was designed for fitting standard and oversized power piston rings on gas engines. Rings are fitted quicker and easier than was possible using the cylinder wall method.



By BYRON R. GOSSETT, JR., General Repairman, Anahuac Gas Plant, Humble Oil & Refining Co., Monroe City, Texas.

Testing High Voltage Electronic Tubes

MAINTAINING high voltage electronic tubes in high frequency induction heater units where a-c voltages peak to 15-kv and higher is a problem. If a breakdown to ground occurs, it usually means a short-circuit as the B lead of the d-c output is grounded to the apparatus.

One important cause of arc-backs and flashovers is leaky tubes. Several methods are usable to determine tube leakage, the main test being visual observation of tubes during operation for pinkish tinges. Small cracks in the glass also contribute to leakage.

A high potential test with 12-kv rms ignition type test transformer can be applied. A 25 ma milliammeter is connected in series with a 10,000 ohm resistor in the high voltage leads. One lead goes to the anode, the other to the cathode.

Voltage is rapidly increased to 12-kv. Good tubes will break down and clean up instantly. A current reading on the meter for more than 5 seconds denotes a gassy or leaky tube. A good tube should stand 12-kv, 60-cycles for at least 60 seconds.

Faulty tubes also have dense coatings spotted near the glass anode seals. This coating will not develop unless the tube has arced back frequently.

High frequency currents do unexpected things: fly off conducting materials; bounce to surrounding objects; leak unexpectedly and make component and lead spacing critical. Proper maintenance requires all insulating bushings and standoffs to be kept clean at all times.

By L. W. FITZPATRICK, Chief Engineer, Department of Corrections, Jefferson City, Missouri.

Snake Dope

POISONOUS SNAKES ARE WIDESPREAD—they inhabit all 48 states and can be found within minutes of Chicago's Loop or New York's Times Square.

People still die from snake bite—antibiotics are of no use against snake bite venom. Bites by large poisonous snakes on the head, shoulders or trunk are usually fatal.

Snakes can't hear—so you can shout for help as long as you stand still. They have excellent eyesight and are sensitive to ground vibrations.

Once bitten, don't try to kill the snake—movement speeds up blood circulation and spreads the venom more rapidly.

Rattlesnakes don't always rattle a warning—they may have lost their rattles or water may fill the spaces between rattles and muffle the sound.

Alcohol is no snake bite remedy—but drink as much water as you can, since swallowing may be difficult later.

These points and a wealth of helpful information are contained in a new "Snake Bite Manual," just published by the National Safety Council.

The manual provides detailed instruction, with many photographs, on how to identify poisonous snakes, where they are usually found, safe practices and protective clothing. A chapter is devoted to field first aid, giving step-by-step treatment of snake bites. Another section provides information of particular interest to medical directors of companies which have field workers in snake-infested areas.

Prepared primarily for the use of public utility linemen, the manual also would be useful in all fields which send workers into off-road terrain, such as oil well drilling, pipeline work, lumbering and railroad maintenance of way.

The 50-page "Snake Bite Manual," illustrated with photographs and charts and including a zoological and medical bibliography, is available for $1.50 from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Pity the Poor Fish

IN THE SOUTH, because of the continued warm weather, much trouble is experienced through the growth of algae in cooling towers and evaporative condensers. The search for a suitable control has been practically unlimited.

A Florida company operates upward of 500 air conditioning units in its various plants and offices. They have had their troubles and have given much study to this problem. They have found that they experienced the best results by turning these units into gold fish ponds. Gold fish seem to thrive on the algae and require no attention.

Past history of scale treatment has involved the use of strong chemicals in these units which, naturally, have a toxic effect on gold fish. Consequently, they cannot be combined in the same units.

Fortunately, this difficulty may be easily overcome according to H. K. Wilson of St. Petersburg, state representative for the American Sand-Banum Co., Inc. His experience has shown that Blue Seal Emulsion Sand-Banum and Sand-Banum Briquettes being of vegetable composition and non-toxic can be used effectively in the elimination of scale and corrosion without injury to the gold fish.

New Steam Tables

NEW STEAM TABLES covering a range from 5500 to 10,000 psia and 32 to 1600 F are now available for power systems calculations. The tables are not based on new data but are reasonable and consistent extensions of the Keenan and Keyes tables.

Developed primarily for industry-wide use during the time required to produce authoritative tables based on experimentation, the new data were prepared by a subcommittee appointed by the Power Division of The American Society of Mechanical Engineers.

Sources of the information and the methods used to arrive at the final results were described at the semiannual meeting of ASME. Authors of the paper were R. C. Spencer, General Electric Company; C. A. Meyer, Westinghouse Electric Corporation, and R. D. Baird, Allis-Chalmers Manufacturing Company.

The subcommittee made use of presently available tables and, in regions not previously evaluated, developed a table using graphical and numerical methods. The new data, plus a table developed by United Aircraft Corporation, were joined to the Keenan and Keyes steam tables to provide data over a broader range of pressures and temperatures. The new tables are expected to meet the needs of industry until ASME, working through technical and research committees as a part of an international program, completes the studies and experimentation for an authoritative steam table to 15,000 psia and 1500 F. Copies of the paper, No. 56-SA-33, can be obtained at 50 cents each from Order Dept., ASME, 29 W. 39th Street, New York 18, N. Y.

Tampa Electric Coal Unloading

TAMPA ELECTRIC Company in Tampa, Florida will, in the near future, be served by the largest coal unloading tower on the Florida coast. This tower, to be supplied by the Mead-Morrison Division of McKiernan-Terry Corp., Harrison, N. J. to the Nashville Coal Co. of Madisonville, Ky., will have an unloading capacity of 700 tons per hour and be equipped with a 6½ ton bucket. Installation of this modern Mead-Morrison equipment typifies the rapid growth and development of this expanding industrial area.

The traveling tower will handle coal that has been shipped down the Mississippi on barges and transferred to ocean-going barges for its trip to Tampa.

The tower will be provided with a new progressive rope reeving system which utilizes a single continuous rope for both hoisting and closing motions. Rope is fed into and removed from the system, a few feet at a time, thus distributing wear equally over its entire length and resulting in a longer rope life than is possible with a two-rope system.

Cause of Bolt Abuse

A BOLT never again has to work as hard as it does during the wrenching up of a rigid joint. It must provide sufficient clamping force on the joined members, and at the same time withstand torsional stresses and adjust itself to loading conditions, explain Russell, Burdsall & Ward fastener engineers.

To keep a joint tight, you must set up residual tension in the bolt. This is the force left within the elongated bolt after tightening that tends to return it to normal, thus continually clamping the material between bolt and nut. A bolt stays tight as long as residual tension exists—that is, until the bolt returns all the way to its original length.

Use Torque Wrench

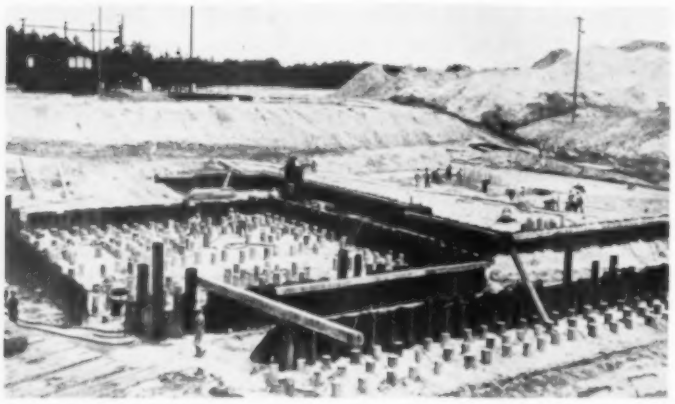
It's easier to tighten a flexible joint too tight than not tight enough. Yet the tendency of the man behind the wrench is to tighten the bolt to the limit of his strength. The hardest job is to convince him to use just enough strength, not too much. The effort needed can be controlled by a torque wrench.

It's easy to measure when you've stressed a bolt too much. A steel bolt will stretch within its elastic limit an amount equal to 0.001-inch per inch of grip length for each 30,000 psi of load. By using a micrometer, you can tell how much a bolt has been loaded and when it has been overstressed.

To figure the approximate torque (inch-pounds) for a bolt, multiply the bolt load in pounds by the diameter in inches by 0.2. Example: A ½-inch commercial bolt can cary a load of 4950 lb. The proper working load for this bolt is 60% of 4950 lb, or 2970 lb. Therefore torque equals 297 inch pounds, which translates into a load of 37 lb pull on an 8-inch wrench.

NEWS *for the South and Southwest*

Sheet Piling Speeds Construction — Miss.



By using steel sheet piling to isolate one construction area from another, **Southern Services, Inc.**, design and construction engineers, managed to leap-frog operations on the **Mississippi Power Company's** new 75,000 kw steam electric generating plant in **Gulfport, Mississippi.** This enabled two ordinarily consecutive operations to be performed at the same time.

As piling sub-contractor for the new plant, Boh Brothers Construction Co., was under pressure to complete its end of the job as soon as possible in order to speed up the remaining construction. In view of the speed required, Southern Services decided to position the piling so that construction on the cooling water tunnels in the basement level could proceed at the same time as construction on higher levels.

At first glance, simultaneous construction on several levels would seem impractical. Obviously, soil from the higher levels would cave in on the basement level. Southern Services reasoned, however, that either wood shoring or steel sheet piling might be used to hold back the earth.

Wood shoring was considered, but was ultimately rejected due to the time, expense, and trouble involved in anchoring wood in the mixture of sand, clay and mud that constitutes Gulfport's soil.

Boh Brothers rented 704 pieces of MP-116 steel sheet piling from the L. B. Foster Company in 30-ft lengths. A Koehring crane was used to position the piling while a McKiernan-Terry steam-driven hammer drove it into the sandy soil.

A-C Birmingham Office

Charles E. Gearing has been assigned to the **Birmingham** district office of **Allis-Chalmers** Industries Group as a sales representative.

Gearing is a graduate electrical engineer of Georgia Institute of Technology and recently completed Allis-Chalmers training course for graduate engineers.

Enterprise Engine — N.O.

Algot A. Green is a newly named sales engineer on the New Orleans branch office staff of **Enterprise Engine & Machinery Co.** Green will work under the direction of **Paul Wabnig,** Branch Manager.

Serving both marine and stationary diesel engine requirements of the territory, Green will work throughout three states, Louisiana, Alabama, and Mississippi. Enterprise offices in New Orleans are located at 441 Baronne Street.

F. J. Evans Eng. Promotions

Mr. F. J. Evans, President and Chairman of the Board of Directors of the **F. J. Evans Engineering Company** announced several promotions of company personnel to the stockholders at their recent annual meeting, held at the firm's home office in Birmingham, Alabama.

J. K. Hawk of Birmingham was elected to the Board of Directors and Vice President in charge of engineering.

N. B. Buehrer of Birmingham was elected to the newly created office of Executive Vice President.

D. M. Mills of Houston, Texas was elected Vice President in charge of the Houston Division.

Jack J. Tyson of Atlanta was elected Vice President in charge of the Atlanta Division.

Buehrer, Mills and Tyson were re-elected to the Board of Directors.

This combustion engineering and equipment firm has served the south for thirty years with offices or representatives in many key Southern cities from Texas to Virginia.

ALCO Products—Houston

Appointment of **Theodore Gupton** as district manager at **Houston, Texas,** has been announced by **ALCO Products, Inc.** He had been manager of the company's Kansas City district since 1934.

Cleco Air Tool—Southwest

George Bush has been promoted to Sales Division Manager of the South Central Sales Division of **Cleco Air Tool Division** of Reed Roller Bit Company, T. E. Donohue, Sales Manager for Cleco announced. This sales division includes six southwestern states.

Bush, who has been with Reed since 1941, has worked as a Tool Maker, Inspector, Engineer and Salesman, before this promotion. He was transferred to the Cleco Division in 1950. He replaces E. W. Clayton, who has been promoted to Manager of Sales Development for Cleco.

Mind if we talk like a Dutch Uncle?

Pardon us for giving advice, but this is the kind of advice that can save you money.

It concerns tubing selection—our number one specialty.

As you know, the ideal material selection for an installation is not always the most expensive pipe or tubing. Yet, some people have a tendency to over-specify — pick a better, costlier tubing than is actually needed. And this happens more often than you might think.

But it doesn't have to happen. If you'll get in touch with National Tube before you buy, our technically trained Mill Service Force will analyze your specifications, at no cost to you. If your installation calls for low carbon tubing, that's what we'll specify. Our responsibility is to prescribe the most suitable materials for the job, at the lowest cost to you. And we never lose sight of the fact that every installation is an individual problem in material selection and must be treated as such. Our Mill Service Force is also available for consultation in the field.

National Tube manufactures seamless pipe and tubes in a complete range of steel analyses from low carbon, through the alloys up to and including stainless steels. A wide range of sizes and wall thicknesses is available for every mechanical and pressure purpose.

Contact us at your convenience.

See The United States Steel Hour. Televised alternate weeks. Consult your local newspaper for time and station.

National Tube Division, United States Steel Corporation, Pittsburgh, Pa.
(Tubing Specialties)
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors · United States Steel Export Company, New York

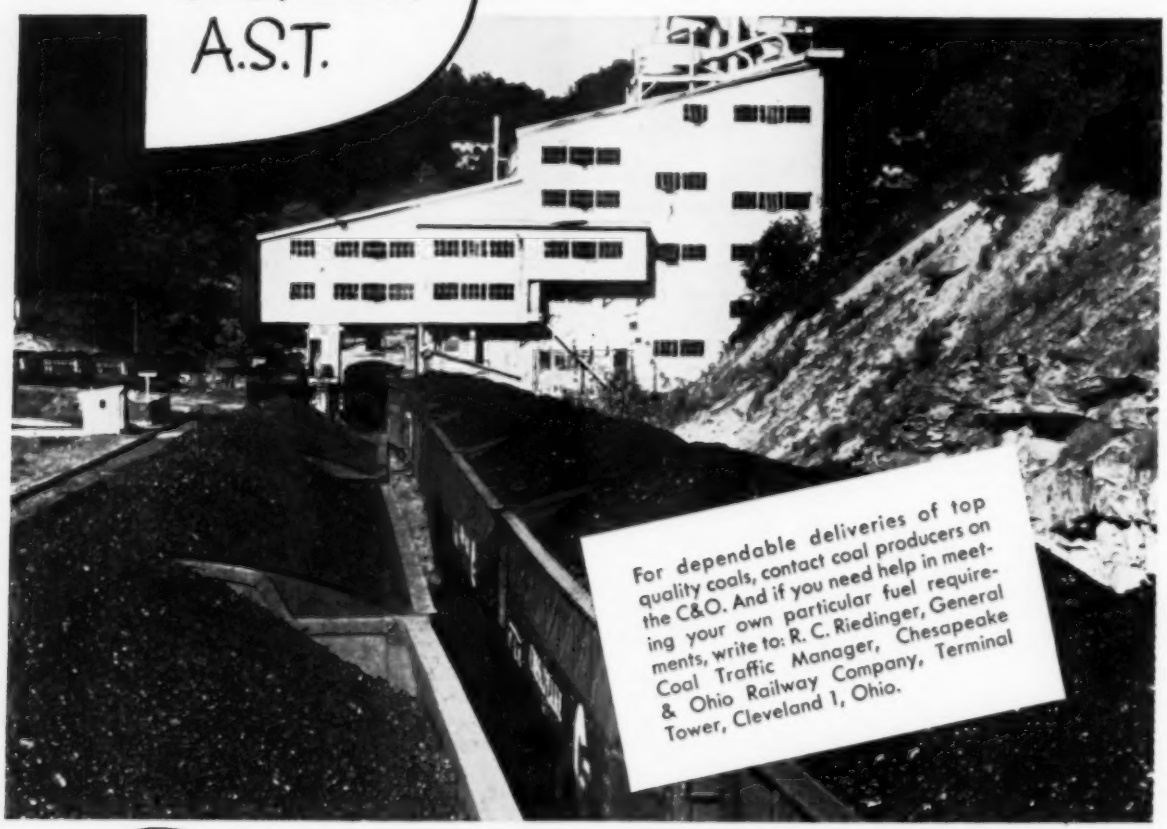
USS NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

Write your own specifications:

VOLATILITY
B.T.U's
SIZE
ASH
MOISTURE
SULPHUR
A.S.T.

. . . the modern, efficient mines on the C&O can produce just what you want.



Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL

Duraloy—Southeast

Milton H. Perry, with headquarters in **Atlanta, Georgia,** has been named District Sales Manager for **The Duraloy Company,** centrifugal casting, pipe and tube fabricator of Scottdale, Pa.

Mr. Perry, with over ten years sales experience in the industrial field, has been associated with Union Asbestos & Rubber Company, and was owner and operator of the Perry Steel Company, fabricator of sheet and strip steel. He will represent Duraloy in Florida, Georgia, Alabama, eastern Tennessee and the Carolinas.

Fulton Sylphon—Sales Dept.

George L. Leupold has been appointed assistant general sales manager of the **Fulton Sylphon Division** of Robertshaw-Fulton Controls Company, according to an announcement by George L. Ogdin, Jr., general sales manager. He will make his office at division headquarters, **Knoxville, Tennessee.**

Mr. Leupold joined the company in 1946 as district manager of the Cincinnati office. He has had more than 20 years experience in the controls field.

Rockwell Mfg.—Houston

Robert S. Grimmett, former Oklahoma City district sales manager for Rockwell Manufacturing Company's Delta Power Tool Division, has been named **Houston** district sales manager.

He succeeds **Warren Sherman,** who moved to **Atlanta** as Southern regional manager earlier this year. The district includes southern Texas and part of Louisiana.

News (Continued)

Rockwell Mfg.—Southeast

Promotion of three key sales personnel has been announced by Lloyd A. Dixon, Jr., vice president in charge of **Rockwell Manufacturing Company's** Meter and Valve Division.

Gilbert T. Bowman, general products manager, and **J. W. Northcutt,** Southern regional sales manager, have been named assistant vice presidents. Both will make their headquarters in Pittsburgh.

Jack H. Walters, product manager-petroleum and industrial liquid meters, will move to Rockwell's Southern regional headquarters in **Atlanta, Georgia,** to succeed Mr. Northcutt.

Richard Moses

Tranter Platecoil—West Va.

Appointment of **Process Instruments & Equipment Co.** as Platecoil distributors in the Charleston, W. Va., area has been announced by the Platecoil Division of **Tranter Manufacturing, Inc.,** Lansing, Mich. Platecoils are specially embossed plates welded together to make a leakproof, preformed channel for the flow of heating or cooling fluids.

Process is owned and operated by **Richard Moses,** a licensed Professional Engineer in the State of West Virginia. Mr. Moses has been connected with the chemical plant equipment and instruments business since graduation from West Virginia University where he earned a BS degree in both electrical and mechanical engineering.

Main office of Process is at 1029 Virginia St., East, Charleston, West Virginia.

Chambers Mfg. Opens Mississippi Plant

The Chambers Manufacturing Corporation has opened a million-dollar plant at Oxford, Miss., to manufacture its gas and electric cooking equipment.

All Chambers ranges, including the console and built-in gas and electric lines, will be made eventually at the 100,000 sq ft plant. Previously, the company's products were made at Shelbyville, Ind.

The plant is almost entirely concrete. Beams, panels, and other parts of the building were pre-stressed and pre-cast at the site.

An unusual feature is the Lindberg radiant tube gas-fired enamel furnace, capable of continuous temperatures up to 2,200 F. The furnace, used in applying porcelain enamel to steel, is a new concept in enamel furnaces, making porcelain work more effective than in the past.

Of special interest is the furnace's construction with vertical radiant tubes for rapid and uniform heating, long life, and simplicity of replacement. The furnace is more than 60 ft long.

Ventilation is complete on all processing tanks, and there is a complete, modern dust collecting system. The ventilation system actually includes three different "sub-systems" — one for the enamel preparation room, another for the furnace area, and the third for the plating room.

All piping and electrical wiring is hung from hooks extending through the concrete roof slabs. A special color coding system is used so that all installations, such as sprinklers, water, gas, and high and low-pressure steam, can be identified readily.

The building has an underfloor drain system for quick shifting of equipment as production techniques and schedules change. There is also a system of bus ducts and flexible overhead cables to facilitate relocating machines without altering the power system. The plant has its own complete sewage and waste disposal system.

Fischer & Porter—Fla.

Fischer & Porter Co. announces the opening of a sales office at 603 Rue Max St., **Pensacola, Florida.** The new office will cover sales territory along the Gulf Coast of portions of Florida, Alabama and Mississippi, formerly handled out of New Orleans.

News (Continued)

Swartwout—Southeast

Appointment of **J. R. Walchli** as product manager of the company's southeastern regional office for the Autronic Process Controls Division is announced by **The Swartwout Company**, Cleveland.

J. R. Walchli

Formerly district manager of the company's Chicago office, and prior to that in Cleveland as sales and application engineer, Mr. Walchli will make his new headquarters at 235 East Ponce de Leon, **Decatur, Georgia**, a suburb of Atlanta. His territory will include North and South Carolina, Tennessee, Georgia, Alabama, Florida and Mississippi.

Swartwout's Industrial Ventilation Division will continue to be represented in the territory by **P. H. Nichols & Co.**, Atlanta.

Fisher Governor—West Va.

Fisher Governor Company, Marshalltown, Iowa, announces the appointment of **J. G. Chilcoat and Company**, 1231 Banksville Road, Pittsburgh, Pennsylvania, as their exclusive sales representative for western Pennsylvania and **West Virginia.**

The new sales office is headed by **Jesse G. Chilcoat**, who has been associated with Fisher Governor Company both in field offices and at the Marshalltown plant over ten years.

S. W. Prince, R. G. Read and **Bob Neville**, all formerly with the W. A. Stoeltzing Company, Pittsburgh, will be associated with Mr. Chilcoat as sales engineers.

Harvey Aluminum—Atlanta

Harvey Aluminum, one of the country's major producers of wrought aluminum mill products, has opened new engineering offices in the Southeast.

Charles D. Menser has been appointed district sales manager for the southeastern region, with offices located at 1430 Peachtree St., N. W., Atlanta, Georgia.

Harvey's general offices and mill are in Torrance, California. Aluminum products fabricated by the company include rod and bar, extrusions, press forgings, special shapes, hollow sections, structurals, forging stock, pipe, tube, impact extrusions, aluminum screw machine products, etc.; also similar items in titanium and steel.

Leon Leonard Joins Betz Engineering—New Orleans

Allen W. Betz of the Betz Engineering Sales Co., 1719 Toledano St., New Orleans 15, La., recently announced that **Leon C. Leonard**, for the past three years office engineer for A. M. Lockett & Co., Ltd., has joined the **Betz Engineering Sales Co.** as Sales Engineer.

Leon C. Leonard

Mr. Leonard is a Mechanical Engineer graduate of Tulane University and a member of the Louisiana Engineering Society.

Betz Engineering Sales Co. represents Centrifix Corp., Electric Machinery Mfg. Co., Elgin-Refinite, Inc., Harrington & King Perforating Co., Hilliard Corp., Henry Pratt Co., Ronningen - Mfg. Co., Spray Engineering Co., U. S. Electrical Motors, Inc. and Warren Steam Pump Co., Inc. in Louisiana, Mississippi, Southern Arkansas, Southern Alabama and the extreme northwest section of Florida.

I-T-E Sales Appointments

Leo H. Lipscomb, vice president-sales, **I-T-E Circuit Breaker Company**, Philadelphia, recently announced the following two appointments which fill newly-created posts in the company's sales organization.

Robert D. Cleaves was appointed manager of utility sales. He will coordinate the company's sales program as it pertains to utility activities. Mr. Cleaves was affiliated with Line Material Company for a number of years in sales capacities ranging through field engineer, district manager, and sales manager of that company's Protective and Switching Equipment Division. Immediately prior to joining I-T-E in 1955, he was general sales manager of Anderson Brass Works in Birmingham, Alabama.

Hugh P. Maxwell was named manager of distributor sales. His previous responsibility for coordinating the I-T-E distributor sales program remains essentially the same as in the recent past, though considerably broadened by reason of a sharp acceleration of company activities in sales through distributors.

A-C Transformer Distributor

The McGowan Electric Supply Co., St. Francis and Macomb streets, **Tallahassee, Florida**, has been named a distributor for Allis-Chalmers transformers in the Tallahassee and Pensacola trading area.

B. L. McGowan is president of the supply firm, which was established in 1955. **M. C. Edwards** is sales manager for the company.

Cameron & Barkley Airetool Distributor

The Cameron & Barkley Co., leading Southeast industrial distributor, with branches in Charleston, S. C., Savannah, Ga., and Jacksonville, Orlando, Tampa and Miami, Fla., announces its appointment as an authorized distributor of **Airetool** tube cleaning, tube expanding equipment and oil refinery specialty tools.

Airetool products will be sold and serviced by Cameron & Barkley in all of Florida — except Jefferson County and those counties lying west of Jefferson County; all South Carolina; and in Columbus, Brunswick and New Hanover counties in North Carolina.

News (Continued)

O'Mara and Flodin, Inc. Dust Control Engineers

Announcement has been made of the formation of **O'Mara and Flodin, Inc.**, Engineers. The company is doing work throughout the United States from headquarters located at 1111 Wilshire Boulevard in Los Angeles, California.

The main activity of the company is in the dust and fume control and drying and air separation fields. The emphasis is on studies, reports and preparation of specifications and engineering analyses of equipment applications and layouts for industry.

Richard F. O'Mara and **Carl R. Flodin** were formerly with Western Precipitation Corporation. O'Mara joined that company in 1937 as General Sales Manager and later was also Vice President-in-Charge-of-Sales and a Director. Since he resigned in 1955, he has done independent consulting work. Flodin joined Western Precipitation in 1944 as a technical engineer and was Chief Technical Engineer when he resigned to associate with O'Mara in the new firm.

The background of the principals represents many years of experience with such equipment as Cottrell electrical precipitators, cyclonic collectors, bag houses, reverse-jet filters, scrubbers and other dust collection devices as well as drying and air separation systems. Their work has included applications in aluminum, cement, chemical, gypsum, nonferrous smelter, oil refinery, paper, power, rock products and steel plants.

Anderson Heads Research Diamond Metal Co.

Dr. Robert J. Anderson has resigned his position as Head, Department of Metallurgy, **Southwest Research Institute**, San Antonio, Texas, where he has served during the last five years.

Dr. Anderson has joined the **Diamond Metal Co., Inc.**, and associated enterprises, **Houston, Texas**, as Director of Research and Development. Before moving to Texas, he practiced as a consulting metallurgist for many years with headquarters at Cleveland, Ohio.

Equipment . . . Supplies . . . Methods

FOR FREE INFORMATION — Circle Code Number on Page 17 Return Card

Spark-Corrosion Resistants Chain Blocks and Trolleys

I-1 A new series of lightweight Spark Resistant and Corrosion Resistant Aluminum Chain Blocks and Trolleys in ¼, ½, 1 and 2 ton capacities is being marketed by **Shaw-Box Crane & Hoist Division** of Manning, Maxwell & Moore, Inc., Muskegon, Michigan.

Applications include hazardous atmospheres or places where safety and resistance to corrosion are of vital importance.

Small Flow Control Valve

I-2 **The Annin Company**, 6570 East Telegraph Rd., Los Angeles, announces production of a new series of valves designed for working pressures to 6000 psi, which will provide industry with an extremely high-speed and responsive small flow control valve.

The new line, designated Model 9460, features use of Annin's 600 Series differential area Domotor operator (patents applied for). The differential area piston eliminates need for loading regulator and will stroke fully in either direction in 0.75 seconds or less.

Offset globe or angle bodies are featured with body sections rotatable in 90° increments for piping convenience.

KEEP UP-TO-DATE
USE SPI
READER SERVICE

See Pages 16-19

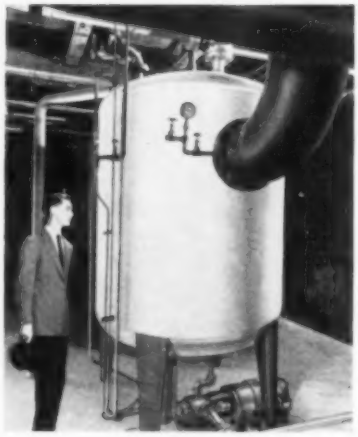
Scale & Corrosion Prevention in Plant Humidifying Systems

I-3 Rustex, a product of the **Anderson Chemical Company, Inc.**, Box 1424, Macon, Georgia, is being extensively used in humidifying systems for the prevention of corrosion and scaling of pipe lines, tanks, spray heads, and similar equipment.

Rustex prevents red or discolored water because it prevents rust and corrosion. By inhibiting scale, it keeps atomizers clean and pipe lines delivering at full capacity.

It is colorless, odorless, tasteless, and absolutely harmless to personnel exposed to the spray. It will not cause discoloration of materials or equipment, or interfere in any way with the normal atomizer operation.

Feeding of Rustex, in systems where the water is under pressure, should be done by means of a chemical proportioning pump, or by drip-feeding into the filter reservoir. Where no pressure is on the water lines, and no filter reservoir is used, Rustex may be drip-fed into the float-operated makeup tank.



Deaerator Design Eliminates Elevated Installations

I-4 A new low-head-room deaerator with standard capacities up to 80,000 lb/hr has been announced by the **Steam Power Department, Worthington Corporation**, Harrison, N. J.

Unit is particularly applicable in the boiler rooms where head-room is normally limited.

Use of Worthington patented deaerator recirculation design prevents a pump from becoming vapor bound and provides maximum deaeration under abnormal operation.

The new design permits the recirculation of stored water through the deaerator. This operation heats the water and effectively removes the oxygen before the water is fed to the boiler.

Packaged Water Chillers

I-5 A line of completely packaged and tested water chillers for air conditioning or industrial cooling applications is available from **American Blower Corporation**, Detroit 32, Michigan.

Designated as Type CC, the chillers are available in capacities from 20 through 150 tons. Each packaged chil-

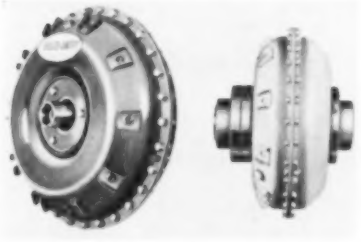
ler unit consists of base and framework, reciprocating type Freon-22 compressor, direct-expansion chiller section, heat exchangers, control panel, electric drive motor and associated valves, strainers and gauges. Across-the-line magnetic motor starters are standard equipment.

A new copper tubing with a star-shaped aluminum insert is a major component. This new tubing has more than double the heat-transfer surface of plain tubing and adds 25% more cooling capacity per cubic foot of chiller size.

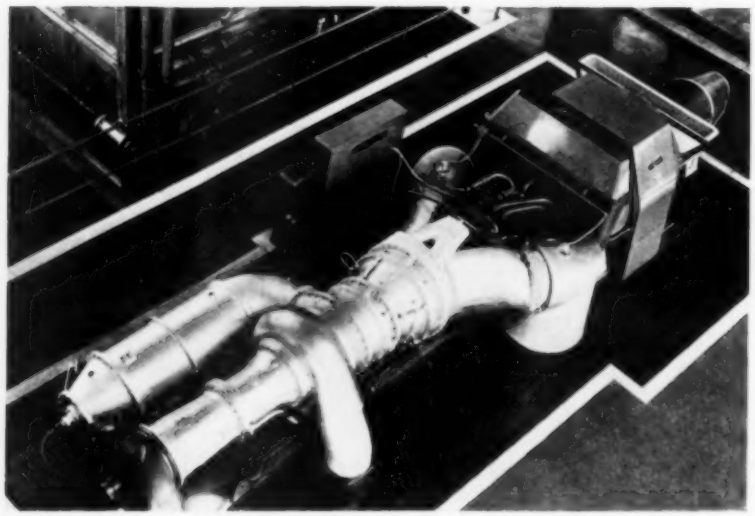
Traction Type Fluid Drive

I-6 A new improved traction type Gyrol Fluid Drive for general industrial application is now available from **American Blower Corporation**, Detroit 32, Michigan.

Designated Size 126 Type T, the basic unit is designed for industrial use with internal combustion engines as a fluid power transmission for mobile material handling vehicles and construction equipment. Power rating in these applications is 25 to 85 hp, depending upon drive speed. When modified by installation of a flexible coupling half on each end of the fluid drive, the new unit is well suited to constant speed electric motor applications for driving production and processing equipment, machine tools, conveyors and other material handling installations. As a motor driven unit, the Size 126 fluid drive is rated 7½ to 15 hp for 1200 rpm drive speed and at 25 to 50 hp for 1800 rpm.



LEFT — basic unit for use with engine drives. The fluid drive is dowel mounted directly to the engine flywheel and bolted either at the flange or at the hub bolting circle. RIGHT — modified unit for use with electric motor drives. On the input side, a flexible coupling half is mounted to the impeller; on the output side, the other half is mounted to an adapter, which, in turn, is mounted to the runner hub.



Use of gas turbines for industrial applications requiring in excess of 3500 Bhp is well established in this country. Turbines of less horsepower, however, have not been generally available. This Mark TA gas turbine, developing 1130 Bhp, is a lightweight, compact prime mover for industrial, refining and processing applications. Over 40 are now in operation throughout the world.

Small 1130 Bhp Gas Turbine Offers Special Advantages

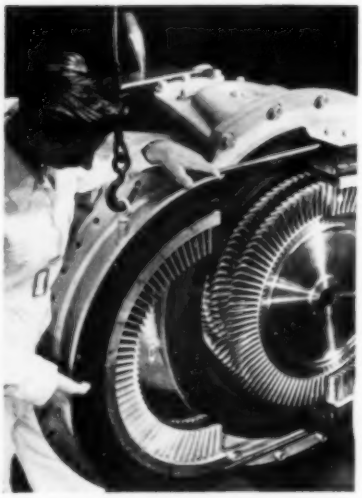
I-7 A compact 1130 Bhp gas turbine — The Mark TA — recently introduced by **Clark Bros. Co.**, Olean, New York, offers special advantages and economies for power generation, centrifugal compressor drives, pump drives and power generation with heat recovery.

Lightweight, air cooling, fuel flexibility, compactness, accessibility and minimum foundations are some of the features.

Gas turbine (weighs only 6 tons) is well suited to stationary or portable power generation, to marine and industrial mechanical drives, and to processes where power is required and where the exhaust energy can also be used for preheating or for the generation of steam—refining, petrochemical, process and manufacturing plants requiring both power and heat.

Simple construction and absence of wearing parts assure low maintenance. Its light weight and freedom from vibration minimize foundation requirements. Unit offers great flexibility in ducting arrangement and combustion chamber location. This adaptability permits the Mark TA to be installed in practically any location to meet piping or process requirements.

Gas turbine is air cooled and self-contained. Design permits full load within two minutes after initiating starting cycle. No cooling water is required. Bulletin 142 covers design features, performance data, typical applications, etc.



Both turbine and stator are readily accessible. Unit can be inspected one hour after shutdown. Note that stator is divided into segments to permit expansion without stress.

Non-flammable Hydrazine

I-8 A new, completely non-flammable form of hydrazine for deoxygenation of boiler feedwater has been placed on the market by **Olin Mathieson Chemical Corporation,** 460 Park Avenue, New York 22, N. Y.

Called Scav-Ox, the product is a 35% solution of hydrazine in water. It has no flash point and no fire point, yet retains all of the advantages of hydrazine as an oxygen scavenger and corrosion inhibitor.

Hydrazine has found limited application in boiler feedwater treatment for several years, but handling precautions necessitated by its flammability have confined its use principally to large consumers such as power generating stations. The new non-flammable Scav-Ox form eliminates these restrictions and also permits shipment of the material in lighter weight, easier-to-handle containers.

In addition to providing operators of high pressure boilers and industrial plant boilers with a safe and more convenient form of hydrazine, Scav-Ox also makes possible the use of the chemical in low pressure heating boilers such as those found in apartment houses, institutions, and public buildings.

Multi-Unit Condensate Pump

I-9 **Byron Jackson Pumps, Inc.,** Box 2017A, Terminal Annex, Los Angeles 54, Calif., announces a new vertical multi-unit condensate pump. This unit features four pumps in a common case and utilizing a common shaft. It has been aptly nicknamed the "Sow Pig" because of its eight flanges (four intake and four discharge). This four-pumps-in-one design was developed to (1) save valuable floor space in power plants, (2) realize economies of a common driver, and (3) increase reliability because the use of four pumps on a common shaft requires only a single stuffingbox—reducing packing maintenance.

Three of the four pumps in each unit are single stage pumps, and the fourth is a two stage pump with an external crossover. The unit is driven by a vertical electric motor. Axial and radial hydraulic balance is obtained by using double suction impellers and double voluted pump cases.

High Temperature Insulating Blanket

I-10 A high temperature insulation blanket of Fiberfrax ceramic fiber, a material that resists temperatures as high as 2300 F., has been introduced by **The Carborundum Company,** Niagara Falls, New York. Made of extremely fine, closely intertwining aluminum silicate fibers, the Fiberfrax blanket keeps its form and properties despite elevated temperatures.

Insulating values at various mean temperatures are tabulated; these factors are expressed in BUT/hr, sq ft and F/in. of thickness.

Mean Temp. F	At Density of 5 lbs/cu ft
600	.50
1000	.86
1400	1.29
1800	1.80
2000	2.10

Because of its insulating qualities, a high thermal gradient through a minimum thickness of Fiberfrax blanket is effected. Where indicated other low temperature blankets may

be used in combination to further reduce heat loss.

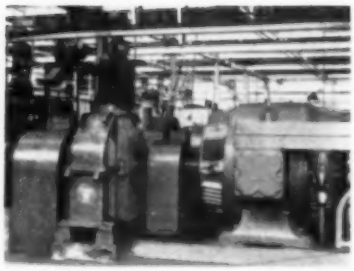
Fiberfrax blankets may be used on high pressure steam lines, diesel exhausts, gas turbines and furnace ducts.

Fiberfrax blanket made without organic binders is available in 25 ft rolls 12" in width and at a thickness of ½".

Heavy Duty Motors

I-11 **Brook Motor Corp.**, 3553 West Peterson Avenue, Chicago 45, Ill., has announced that large a-c electric motors up to 600 hp are being stocked at its warehouses in principal cities. Motors of 500 and 600 hp are available in drip proof and fan cooled types; depending on size, in either squirrel cage or slip ring.

These large, heavy duty motors have found such ready acceptance that Brook now stocks them in many of their 14 warehouses. Being conservatively rated, they are cool and quiet running and feature ease of installation such as extra large conduit boxes as well as ready accessibility for lubrication and maintenance.



The new Brook 600 hp, a-c motor

Electric Floor Sweeper Has Variable 3-Speed Trans.

I-12 A new type of power sweeper, powered electrically, and with a 3-speed transmission forward, plus one in reverse, has been introduced by **Wayne Manufacturing Company**, 1201 Lexington Ave., Pomona, California.

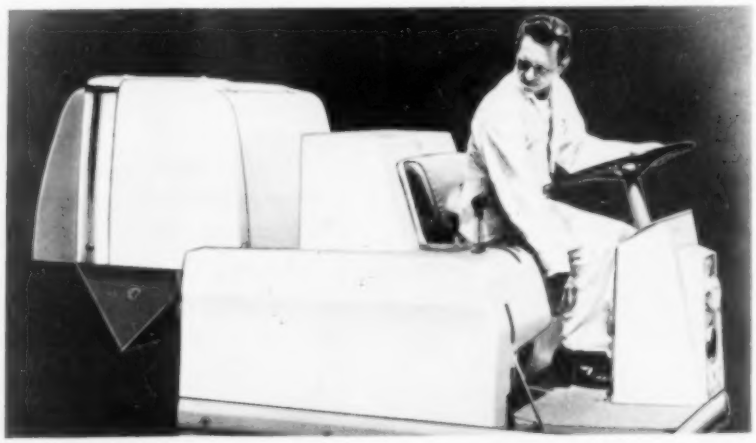
The new Model 605-E operates with two motors. One is for travel and one for power to brushes and vacuum. This prevents drain on the batteries when the sweeper is merely travelling to or from a job, and makes it possible for the sweeper to operate a normal 8-hour day without recharging.

Since there are no fumes and no noise, the sweeper is ideally suited for use in modern air conditioned plants dealing with foods, chemicals, pharmaceuticals, etc.

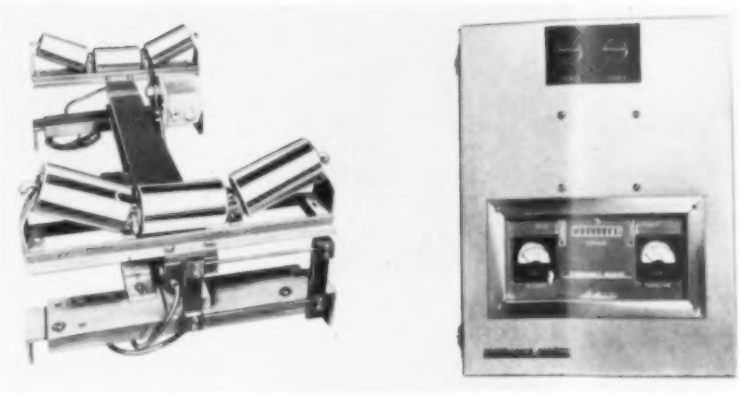
The Wayne 605-E Electric sweeper is capable of sweeping up to 70,000 sq ft per hour in open areas. The three-speed transmission, which is exclusive with Wayne, provides gear ratios for maximum efficiency under every sweeping condition, even up steep grades.

Every operating feature of the new 605-E has been proved practical on Wayne gasoline-powered sweepers in hundreds of plants. These features include "FilterVac" Dust Control, which eliminates the need for a dust bag to empty. Dust is deposited in the main dirt hopper prior to entering the fan. Another feature is hydraulic power dumping in a compact pile at the rear of the sweeper while the driver is seated.

Side brooms are available for either the left or the right, or for both sides, and when combined with automotive type steering and a 5-foot turning radius, make close sweeping possible under almost any conditions, and in any direction. Sweeping swaths are 36-, 48-, and 60-inch widths.



Quick (5 sec.) hydraulic power dumping on the new Wayne electric sweeper while driver is seated. Compacted pole is dumped at rear.



Electronic Belt Conveyor Scale weighs material "on the run"—load weight on a riven area of belt and speed belt travel are integrated electronically and expressed in accumulated tonnage on a remote register. Unit eliminates need for a separate weighing operation and provides close control over belt loading. Remote indicator shows per cent of capacity at which belt is running; second indicator shows tons per hour being delivered.

Electronic Scales and Weigh Batching Instruments

I-13 A new conception in fast, accurate weighing and weigh batching was recently announced by **Fairbanks, Morse & Co.**, 600 S. Michigan, Chicago 5, Ill. Employing electronic load cells, a complete line of weighing instruments has been developed that assure accuracy, faster weighing plus the convenience of remote weight indication.

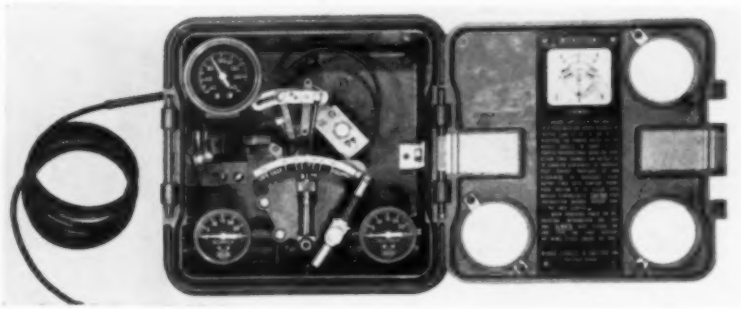
Two basic types of electronic scales are available . . . **Full Electronic** in which load cells replace the conventional lever systems and **Levetronic** in which a conventional lever system is used but with a load cell hooked in tension in the steelyard rod. The Levetronic system can be used to convert existing full mechanical scales to electronic weighing and instrumentation.

The electronic instrumentation made possible with electronic weighing devices streamlines weighing operations and simplifies data processing. Weight recording instruments may be located as much as 250 ft from the scale platform.

In addition to electronic scales, the new Fairbanks-Morse line includes two unique electronic weigh batch control systems. The **Batchetron** is an electronic control system for batch weighing of any type of material that can be handled into the batch hopper by piping, conveyors or belts, or from overhead supply bins where materials are controlled by gates or valves. Through the instrument, each ingredient of a batch is pre-selected and automatically weighed and controlled through the batching operation. The operator merely preselects the ingredients according to formula, presets the required amounts on the instrument controls, and pushes the start button. Many auxiliary controls are available such as timers, batch counters, "read out" devices, etc.

The **Electronic Program Control** is an automatic batch control unit that operates from a pre-punched card. Formulas are punched on a card and the card dropped into a card reader slot on the instrument. The EPC "reads" the card and automatically selects the right ingredients, weighs them in the weigh batch hopper, and discharges them to following process equipment. The chance for human error is virtually eliminated. Punched card formula control automatically insures exact duplication of formula every time. A formula can be used, the card filed away, and months or years later used again. The results will be exactly the same as when originally set up! Auxiliary controls are available such as batch counters, timers, "read outs" to billing machines, adding machines, etc.

Equipment, Supplies & Methods (Continued)



Temperature Controller

I-14 A new temperature controller which gives positive fluid - flow control through diaphragm operated valves, based on temperature variations, has been introduced by **Black-Sivalls & Bryson, Inc.,** 7500 E. Twelfth St., Kansas City 26, Mo.

The Type 1460 controller, equipped with an external vapor-tension thermal system to actuate the power unit in the pilot, offers a choice of temperature ranges. By simple adjustment, it permits either 100% throttling action or "on-off" snap action within a wide limiting range.

The 1460 has all the excellent features offered in the 1440 and 1450 pilots built by BS&B, being identical except for the actuating mechanism. Two pressure gauges and a temperature indicator are compactly built into the pilot case.

Packaged Fire-Tube Boiler

I-15 Fire - tube boiler - burner units with the installation and operating advantages of the Scotch marine type "Steam-Pak" packaged steam generators are offered in a full line of ratings by **York-Shipley, Inc.,** York, Pa.

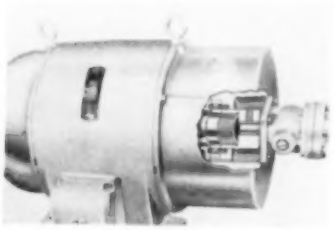
The package design eliminates the need for stack, pitting and brickwork. Water cooling virtually eliminates replacement and maintenance costs of the carborundum combustion chamber and increases boiler capacity.

A four-pass arrangement of the boiler tubes assures maximum heating efficiency. The unit can be furnished to supply either low-pressure steam (15 psi) or hot water (30 psi). Firing may be by No. 3, 5 or 6 oil and/or natural or manufactured gas. Boiler can also be converted to coal firing by the addition of a grate.

The new "YFB" line of fire-tube boiler-burner assemblies is offered in equivalent net steam ratings of 3,000 to 35,000 sq ft and in equivalent net hot water ratings of 4,800 to 56,000 sq ft. Each boiler-burner unit is fire tested and adjusted for high and low fire prior to shipment from the factory.

Spline-Coupled Hydraulic Pump Motor

I-16 According to the **Reuland Electric Company**, Alhambra, Calif., this new spline coupling method of hooking up a hydraulic pump to an electric motor's output shaft eliminates all adapter and alignment problems. Time required for installation is also approximately 1/10 as long as conventional hook-ups.

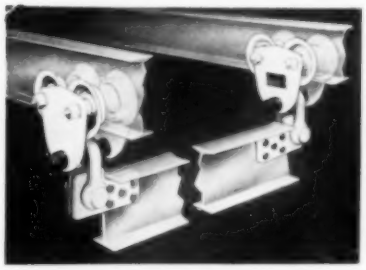


Other features include: Streamlined appearance, since entire hook-up is enclosed in the motor's end bell; spline coupling supplied with motor; new set-up accommodates all standard make pumps, and compactness. As an example, the new 30 hp unit is 2½" shorter than the previous 15 hp unit.

Reuland Spline-Coupled Hydraulic Pump Motors are available in ratings from 15 hp through 40 hp in frame sizes 324U and 326U. Supplied for either single or double end pump installations.

Bridge Crane Assembly Kit

I-17 **Shaw-Box Crane & Hoist Division** of Manning, Maxwell & Moore, Inc., Muskegon, Michigan, is marketing a kit for less than $100 from which a push-type underhung bridge crane can be easily assembled.



Called the "Budgit" Single Carriage Bridge Crane Assembly, Catalog No. 64, the kit can be installed on a locally purchased bridge I-beam in less than two hours. Five holes drilled in each end of the I-beam permit bolting the two trolleys provided to the ends of the beam.

Each kit consists of two "Budgit" I-beam trolleys; two clevises with pins; two pairs of beam end plates and necessary spacing washers, bolts, nuts and lockwashers.

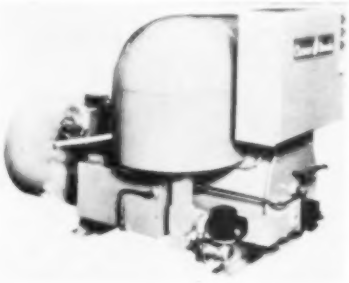
The cranes will handle spans up to 25 ft and are available in capacities up to 2000 lb. Wheels are easily adjustable to operate on American Standard I-beams of from 6" to 12" size.

Used in conjunction with a chain block or electric hoist, the kit provides a complete, extremely economical crane ideal for serving localized areas, small shops, shipping and loading docks, and many other applications.

Air Atomizing Oil Burner

I-18 A new air atomizing burner designed to burn No. 6 oil, is being offered by **Cleaver-Brooks Company**, 326 East Keefe Ave., Milwaukee, Wisconsin.

This new 90 gallons per hour burner introduces a new method of burning residual oils that obsoletes previous methods. Cleaver-Brooks new design is the first burner of its type ever developed for burning No. 6 oil.



Air and oil are metered in the proper ratio at all capacities to assure maximum efficiency. Oil is finely atomized so that it burns easily and completely. Positive acting metering pump gives measured delivery of oil. Once the burner is set for the most efficient combustion it remains at that point indefinitely.

Low fire start assures safe, smooth ignition and prevents puff. Burner does not start at full capacity but begins with a small flame which is gradually built up to the required size. The shape of the flame is adjusted for the type of boiler it is to be used with.

Pressure-Ratio Computer

I-19 A pneumatic pressure-ratio computer that measures compressor inlet and outlet pressures and simultaneously calculates the ratio of these two pressures is now available from **Hagan Corporation,** 323 Fourth Avenue, Pittsburgh 22, Pa.

Pressure-ratio is a key variable which must be regulated in order to prevent flow instability or surge in exhauster, compressor or blower control systems. The instrument indicates pressure-ratio on an integral scale and generates a pneumatic signal proportional to pressure-ratio for use in a control system. The Model PR-O can be used in any other application which requires the calculation of the ratio of two pressures.

Ratio calculating accuracy of the computer is high even when the input static pressure turndown ranges are as great as 30 to 1. The computer's pneumatic output signal can be used for control within the normal distance of pneumatic transmission, since the pneumatic output is proportional to the ratio. Remote recording or indication of the ratio can supplement the local mechanical indication within the computer. Details in Bulletin MSP-103B.

Atomic Trends

(*Continued from Page* 80)

is "not moving with speed and determination to convert atomic energy into an instrument of peaceful progress."

World Project

Senator Clinton Anderson in an address given at the Sixth Annual Conference on High Energy Physics, held at the University of Rochester, proposed the establishment of international atomic laboratories. He said such laboratories would provide a common working place for scientists of all nations where they could attack the problem of getting power from the fusion process.

The fusion process is considered to be the ultimate objective in the conversion of nuclear energy into power. In this process the nuclei of heavy hydrogen are fused under a temperature of many millions of degrees. Project Sherwood in this country, and similar projects in other countries, seek a solution to the problem of a controlled and regulated fusion process analogous to that of fission in a nuclear reactor.

Air Conditioning Maintenance

(*Continued from Page* 51)

tem, and should indicate between 10" and 20" of vacuum when the machine is in operation; the central gauge indicates the pressure in the lower shell of the unit and will record from 30" of vacuum to 15 lb pressure, but 26" of vacuum is desirable at this mill. The right hand gauge indicates pressure in the upper shell of the unit, and is also a compound gauge. When the compressor is in operation it will read from 6" to 12" of vacuum, if operating efficiently.

However, at times the right hand gauge will show a pressure rise, indicating that the purge system must be put in operation to clear the condenser (high side) of gasses that will not condense due to impurities and vapors.

Deposits of dirt and scum on the inside of the tubes forming the cooling coils, and also the condenser, will gradually reduce the operating capacity and efficiency of the entire cooling unit. The covers of both the condenser and chiller water boxes are removed at the end of every cooling season, and are very thoroughly cleaned with a flexible brush and flushed with a hose and clear water.

In general, refrigeration service men are familiar with reciprocating type compressors, but are unwilling to attempt servicing centrifugal type refrigeration such as is used with the large chill water systems of air conditioning.

The present system has been in use at this plant for a few years, and by following the simple maintenance procedures outlined in this article, the air conditioning equipment has been operating at top efficiency except for a few isolated instances.

Electrical Instruments

(*Continued from Page 54*)

will show even when the conductor is in a conduit. It is suitable for both a-c and d-c and can be of great help in detecting grounding in the early stages, and thus avoiding shutdown failures.

Vibration Indicator

The light beam vibration indicator (Figs. 12 & 13) is an electrical maintenance instrument designed to measure vibration accurately by placing its stylus against the vibrating equipment. The peak to peak vibration displacement is read on a frosted glass scale. It is used in preventive maintenance to check the vibration of machinery that might be damaging to it, the building or other equipment.

Hand Pyrometer

A hand pyrometer (Fig. 14) is now to be had which greatly facilitates the checking of the temperatures of molten metals, gases, liquids and surfaces, including plastic molds, pre-heated metals and metals used for die casting. It is also used for measuring the heat of bearings, and is a great time saver. It has two scale ranges, namely 0 - 500 degrees F and 0 - 1500 degrees which are changed by means of a simple switch which makes it very versatile.

While the foregoing is by no means a complete list of portable electrical instruments which are available for maintenance purposes it gives a good idea of the many purposes for which they can be used to good advantages. Whenever the plant engineer encounters some situation where an instrument would be helpful he will do well to consult with one of the instrument manufacturers.

While the photographs employed here for illustrations are necessarily representative of individual manufacturers, comparable or competitive devices are available from several sources. Photographs 1-5 were furnished by Westinghouse, 6 by Pyramid Instrument Co., and 7-14 by General Electric Co.

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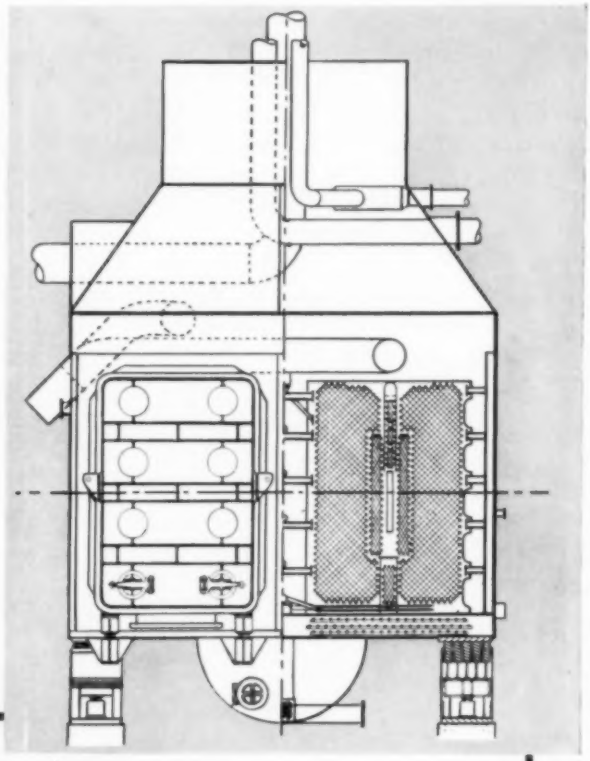

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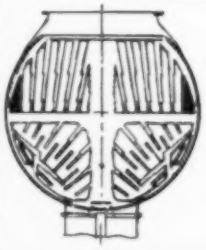

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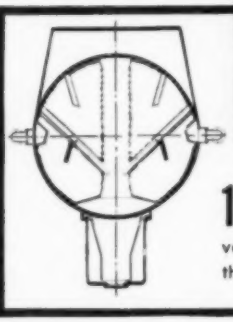

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